

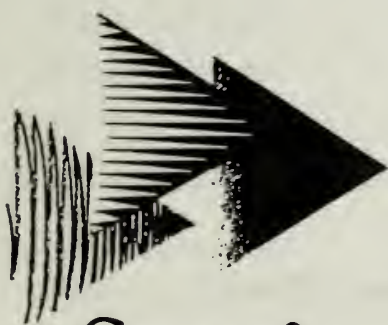
CONSTRUCTION TECHNOLOGIES

Course of Studies

DRAFT

1993-94 Field Review

- Introductory Level
- Intermediate Level
- Advanced Level



Career &
Technology
STUDIES

AUGUST 1993

Alberta

EDUCATION
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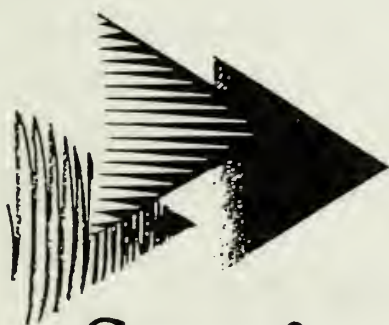
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CONSTRUCTION TECHNOLOGIES

A. STRAND PHILOSOPHY AND RATIONALE

PHILOSOPHY

The Career and Technology Studies curriculum recognizes that many students learn concepts best when they can experience a practical application of theory. Students retain these concepts when they can see how certain knowledge, skills and attitudes relate to their personal life and career goals.

Construction Technologies will demonstrate the Career and Technology Studies philosophy in the following manner:

- Teachers will individualize delivery and assessment techniques to suit their students' learning styles.
 - The curriculum will be delivered using the student-directed approach with an appropriate developmental emphasis. Teachers will manage the learning situation according to developmental appropriateness.
 - Hands-on activities will be emphasized.
 - Integration of theory and practice will be emphasized throughout activities.
 - All students will be encouraged to engage in activities in a safe environment with consideration of personal and psychological safety.
 - Opportunities for cross-curriculum instruction will link CTS with concepts from science, mathematics, physics, English, biology, chemistry, business education and/or engineering.
- Integration of labs and classes will occur where beneficial. Students from different classes, strands and programs will work together in project teams.
 - Teamwork and interpersonal skills will be developed in school and community settings and by addressing realistic problems.
 - Design and problem solving will be incorporated into all modules.
 - A variety of appropriate instructional environments (e.g., schools, the community, business, industry and other educational settings) will be used to the students' benefit.

The Construction Technologies curriculum is patterned on the approach that good educational programs include activities that foster students' development in all three domains: cognitive, social and physical. Construction Technologies addresses the cognitive domain in activities such as the application of theory, planning and product evaluation. Social development occurs through student interaction in teams that cooperatively research, plan and complete projects. Progress in the physical domain will occur during practical activities requiring hand-eye coordination and manual dexterity. Development of these domains will also be encouraged by using student-directed activities, which motivate the students to achieve higher levels through the perceived value of the end products.

RATIONALE

Construction Technologies is included within Career and Technology Studies partly because of Alberta's climate and lifestyles: we live, work and play in structures frequently made of wood, synthetics and earth materials,[★] and we use many objects made of these non-metallic materials. Our reliance on these structures and objects has caused us to value the knowledge, skills and attitudes related to their construction.

Students must also prepare for independent living and working in the future. This strand will allow them to investigate and gain knowledge, skills and attitudes associated with Construction Technologies that will meet their particular needs as future adults. Although some students will later work in occupations related to building or maintaining structures, others will take this strand for personal use in hobbies or to become informed consumers. This strand will meet individual needs through module selection in accordance with future goals.

Construction Technologies is important to students' education because it:

- provides practical applications for knowledge, skills and attitudes from this strand and other courses
- integrates theory and practice
- develops competencies in Construction Technologies and other CTS strands that are relevant to every student as daily living skills
- builds self-reliance and independence
- promotes development of student self-esteem and self-awareness through problem-solving skills and practical activities

- provides opportunities to develop portable skills that are relevant across a wide variety of career areas
- provides opportunities to exercise creativity in technological areas
- provides confidence-building experiences that emphasize a hands-on approach
- provides opportunities for self-directed learning through a variety of learning modules
- recognizes that the Career and Technology Studies curriculum can lend itself to a variety of student learning styles and ability levels
- can be delivered in a wide range of learning environments
- provides teachers with learning modules that allow for exploration of a large number of interests.

[★] The term "synthetics" refers to materials commonly referred to as plastics, fibreglass, foams, mastics, etc. The term "earths" refers to materials such as clays or concrete mixtures.

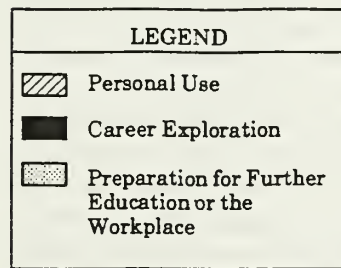
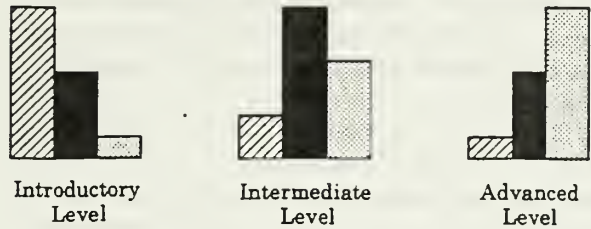
B. STRAND ORGANIZATION

CURRICULUM STRUCTURE

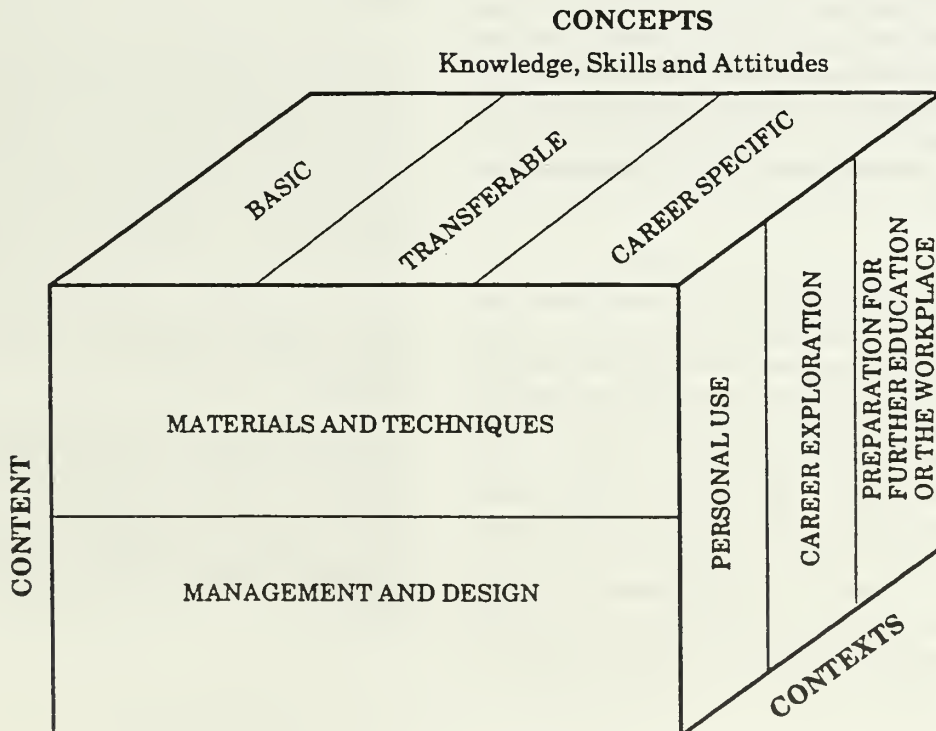
Construction Technologies is a strand in Construction and Fabrication Studies. It is available in three levels—introductory, intermediate and advanced—and is offered in secondary schools to students approximately 13 to 18 years old. This strand addresses the knowledge, skills and attitudes that are required when planning, building, maintaining or repairing structures or objects. These structures or objects are generally constructed of materials such as wood, synthetics or earth products. (Working with metal materials will be covered in the Fabrication Studies strand.)

Students who enroll in Construction Technologies will be challenged to develop competencies for working on tasks in this area. These competencies will be used as life skills and will potentially be used for exploring or preparing for further education and training or for an occupational path. The Construction Technologies curriculum will tend to concentrate

on one of these aspects at each level and include lesser emphasis on the remaining two purposes of CTS. The following illustrations show the focus of each level.



DEVELOPMENT MODEL



The Construction Technologies curriculum is designed around a model that illustrates the integration of the content, concepts and contexts.

Content

The front face of the cube shows a classification of the content. The term "content" refers to what is taught. These classifications consist of "Materials and Techniques" and "Management and Design."

Materials and Techniques relates to the material and procedures used to produce a product such as a bookshelf, a scaffold or a home. **Materials** in this strand tend to be woods, synthetics and earths. Many of the modules provide opportunities to incorporate a mixture of materials or they will substitute or alternate materials, such as metal. **Techniques** refers to the safe procedures associated with the hand tools or power equipment selected for the task.

The **Management and Design** classification can be best understood if the term is broken into its two components. **Management** refers to the skills involved when working with other people in a workplace, the processes related to maintaining a safe, effective and efficient work site, and decision making. **Design** refers to identifying problems, creating alternatives, creating drawings, evaluating the finished product and determining improvements for future production. Although these terms are defined separately, in reality they are interwoven in the context of Construction Technologies.

Concepts

The concepts, consisting of knowledge, skills and attitudes (KSAs), are arranged across the top face of the cube. A **basic skill** is used within all areas of Construction Technologies. For example, swinging a hammer is a basic skill. **Transferable skills** are used in several areas, for example, pulling nails with a claw hammer. **Career-specific skills** are used in only one area, for example, using a shingling hatchet to split cedar shakes for roofing. Other examples of basic, transferable and career-specific classifications are shown on the following chart.

Basic	Transferable	Career Specific
Identifying basic types of woods	Identifying wood features and defects	Selecting an appropriate wood for a project
Taking lineal measurements	Laying out cuts in material	Laying out joists and stringers
Reading an illustration for details	Reading specifications for an installation of service lines	Reading engineering specifications to create shop drawings
Cutting with a hand saw	Using a power mitre saw	Selecting, mounting and using a specialty mitre saw blade for millwork tasks
Preparing a project materials list	Costing materials at a supplier	Developing a cutting list for a set of lintels
Performing basic computational operations (i.e., adding, subtracting, multiplying, dividing)	Using trigonometry to lay out angles	Laying out and notching stair stringers

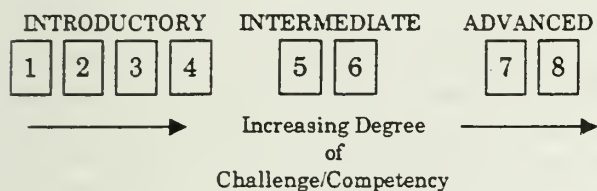
Contexts

The contexts listed on the side of the cube refer to how the concepts can be used by the student. For all students, Construction Technologies will provide skills that they, as independent adults, can use for the rest of their lives. Many of the students can use this strand to explore career opportunities. Although some students may select other fields of employment, others will use Construction Technologies as a way of preparing for the world of work or for further occupational training.

The Development Model is modified in the three levels in Construction Technologies by the addition of themes to the front face of the cube. This is done to emphasize the importance of integration for successful implementation of this strand.

Competency Levels

The following numeric code has been assigned to the three levels to indicate the increasing degree of challenge. These numbers are related to standards of competency, not the student's age or grade level.



THEMES

Seven themes have been incorporated into each module in Construction Technologies. These themes are:

- Materials
- Tools, Equipment and Procedures
- Fastening Systems
- Safety
- Design
- Finishing
- Careers.

These themes are to be delivered at appropriate times within the instruction and experiences planned for Construction Technologies students. By integrating these themes into practical activities, the students will have the opportunity to understand the importance and relevance of the themes. This integrated approach is related to the environment in the home and workplace where the themes are part of all activities and are not separate or distinct.

The **Materials** theme refers to the woods, earths and synthetic products used in tasks. Wood materials will include common varieties suited to relevant instructional tasks. Earth materials will include clays and concrete mixtures. Synthetics will include material previously referred to as plastics. Metals will be used where appropriate to a given task. Composites made of two or more material types will be used where appropriate.

The **Tools, Equipment and Procedures** theme refers to the hand tools, power tools and powered equipment used. The appropriate item will be selected according to the task and student's level. This theme will also address techniques as they are integral to the safe and effective use of tools and equipment.

The **Fastening Systems** theme refers to the various processes and devices used to join materials. Some examples include mechanical fasteners (e.g., screws, rivets) and chemical fasteners (e.g., solvent welding, adhesives).

The **Safety** theme refers to the information procedures and attitudes used to ensure that the work site is safe and clean, and that hazards in procedures are minimized or eliminated. Topics will include WHMIS, OHS, common hazards, safe work habits and local safety practices.

The **Design** theme refers to the process used to identify problems and select an appropriate solution. Some stages in this process include problem identification, generating alternatives, identifying the best alternative, validating the choice and communicating the solution or design. Aspects of this process include technical drawing, model making and prototype testing.

The **Finishing** theme refers to the procedures used to produce an appropriate finish for a product. The finish may be used to improve the appearance of the item or to protect the surface. Some examples of finishes used in Construction Technologies include water- and oil-based finishes and waxes. Procedures may include sanding, sealing and finish application.

The **Careers** theme addresses the opportunities that these concepts provide to the student. These opportunities may relate to hobbies, volunteer work, occupational preparation or direct workplace entry.

PROGRAM PLANNING

The process of planning a program should include the student's reason for taking Construction Technologies and should balance educational guidelines with resources in the school and community.

Using community resources is an important facet of Career and Technology Studies. Realistic experiences with a variety of mentors will promote students' personal and competency growth and will provide them with information for planning their future. Community resources may also provide additional exposure to workplace expectations, to further opportunities and to current technologies.

While this document provides educators with guidelines, only the on-site educator knows the students, school and community well enough to plan the instruction of the classes. School-based planning, combined with given competency expectations, will provide the students with the best delivery of the Construction Technologies curriculum. Educators are encouraged to integrate locally developed materials to meet student needs.

Grouping Options

Career and Technology Studies modules are designed to be linked together in an appropriate combination to meet student needs. The group may consist of 3 or 5 modules depending upon the school's timetabling guidelines. Some timetabling options allow for combination of modules from two or more strands. This provides students with a wider exposure to Career and Technology Studies opportunities and meets their individual needs.

Prerequisites

Modules should be selected to meet student needs within the resources available in the school and community. Some modules do, however, require prerequisite modules the students must take to prepare them for higher levels. If students can successfully challenge the pre-test of the prerequisite modules, they do not have to take these modules. They will receive credit for them and can move onto content better suited to their needs.

Note: Additional ideas for delivery options are in the monograph *Expanding Options* (Alberta Education, draft 1993).

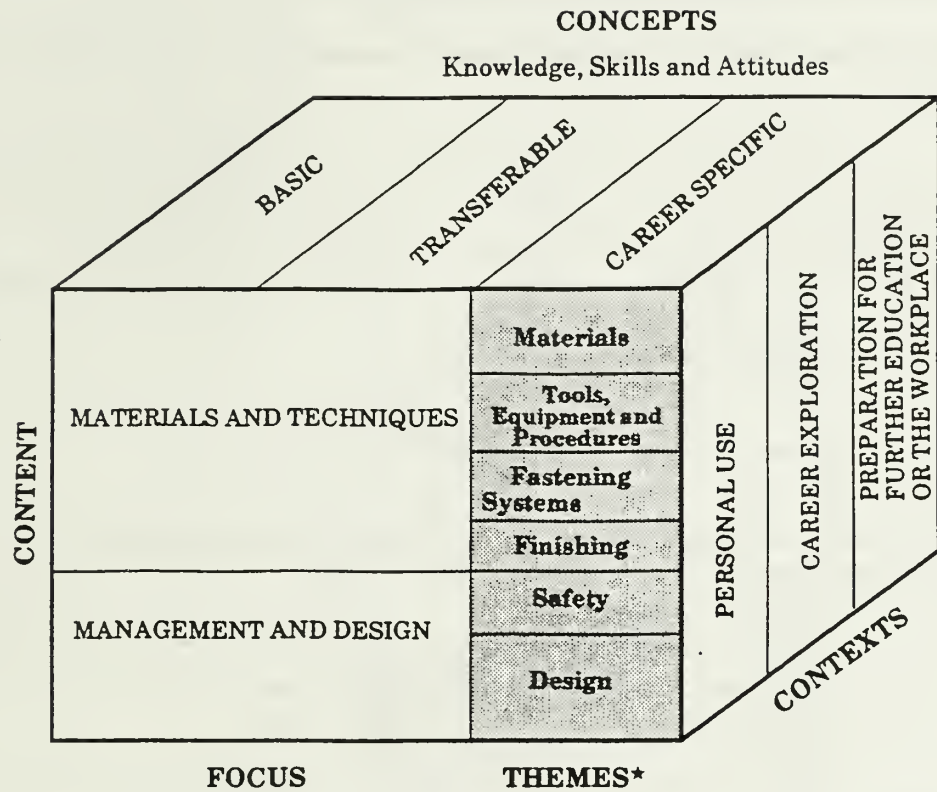
Time Requirements

Construction Technologies modules were designed to fit within a suggested 25-hour instructional time period. This is only a guideline to facilitate planning, because the Career and Technology Studies curriculum is competency based and the student may take more or less time to gain the knowledge, skills and attitudes within each module. Grouping the modules will create a larger time slot and allow students' fast or slow progress to average out to the planned time requirement. Students who have made rapid progress are expected to progress to the next selected module in their program plan.

Introductory Level Modules

Introductory level modules are designed for students who have little or no experience related to the knowledge, skills and attitudes associated with Construction Technologies. Most students in these modules will be about 12 to 14 years old. Some older students may enroll in these classes for personal interest or in preparation for intermediate and advanced level modules in Construction Technologies if they do not have the competencies and experience to challenge and "pass" the necessary pre-tests. Note that some modules have prerequisites.

Development Model: Introductory Level



Levels Progression: Introductory Modules

1	2	3	4	
CFS101 Introduction to Construction and Fabrication Studies	CT103 Combining Materials in Production CT106 Fabrication with Synthetics	CT103 Combining Materials in Production CT107 Recycling and Repair Procedures CT108 Mold Making and Casting	CT104 Prototype Design for Production	CT105 Mass Production

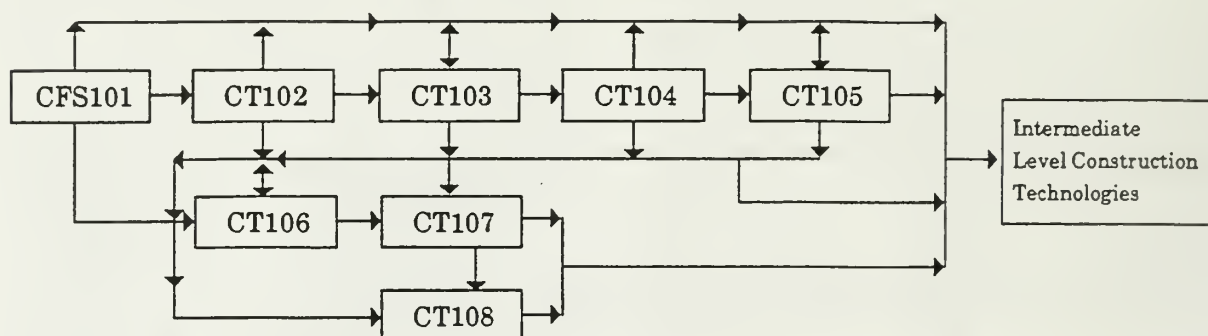
INCREASING DEGREE OF CHALLENGE/COMPETENCY
→

Code
TITLE

Sample Classroom Programs: Introductory Level

Administrators and teachers will plan the delivery of the Construction Technologies curriculum by considering student needs as well as resources and expertise available on campus or in the community. Most introductory level instruction will occur on campus.

The following schematic illustrates possible combinations of introductory level modules in this strand.



The following examples suggest a variety of module combinations that may be offered in introductory level Construction Technologies.

Note: The examples assume the student:

- has not successfully challenged the CT101 module pre-test
- wants to specialize in Construction Technologies.

Sample 1 CFS101 CT102 CT103 CT104 CT105

Sample 2 CFS101 CT102 CT103 CT106 CT107

Sample 3 CFS101 CT102 CT106 CT107 CT108

Sample 4 CFS101 CT102 CT103 CT106 CT108

Other programming options may include mixing two or more strands. Students would, however, include the required foundation modules for each selected strand in their program.

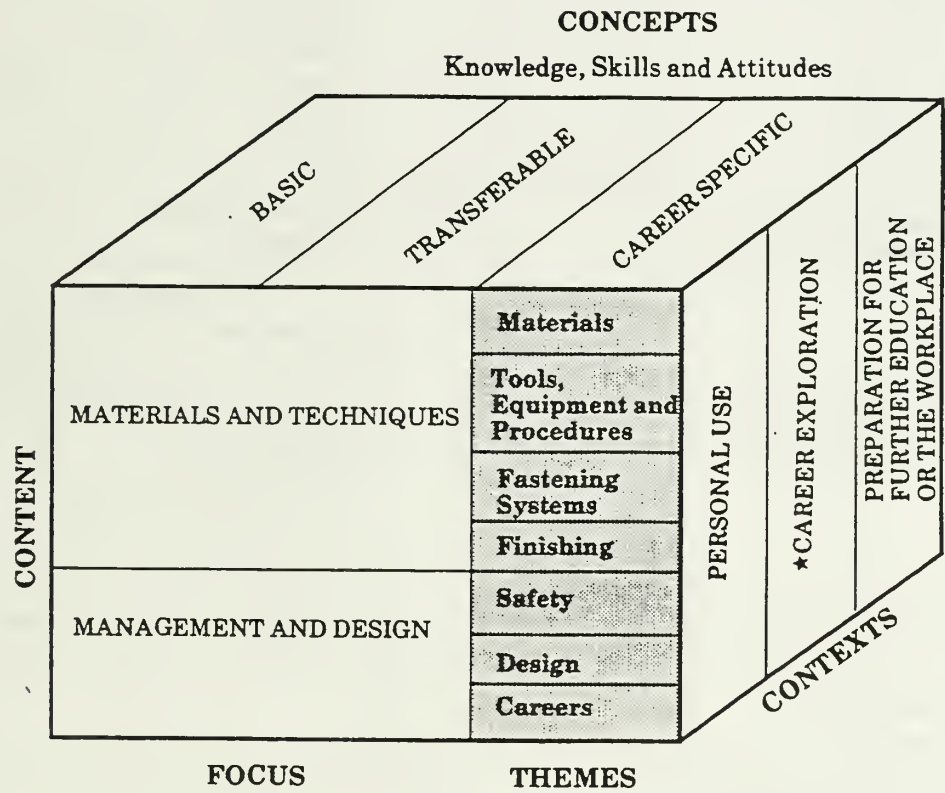
Sample 5	CFS101	CT102	CT103	Sketching and Drawing Fundamentals	Design Fundamentals Problems
Sample 6	CFS101	CT104	CT105	Planning a Venture	Promotional Studies
Sample 7	CFS101	CT106	CT108	The Design Process	Heat Forming
Sample 8	CFS101	CT107	CT108	Cold Forming	Sketching and Drawing Fundamentals

Intermediate Level Modules

Intermediate level modules are designed for students who have successfully demonstrated the required competencies of the introductory level in Construction Technologies. Most students in these modules will be about 14 to 15 years old. Some students may enroll in these classes in preparation for advanced level modules in Construction Technologies if they do not have the competencies and experience to successfully challenge the necessary pre-tests.

Some intermediate level Construction Technologies modules have prerequisites. Students select additional modules to meet their needs, the school's timetabling guidelines and available educational resources in the school and community.

Development Model: Intermediate Level



★ Indicates emphasis at this level.

Levels Progression: Intermediate Modules

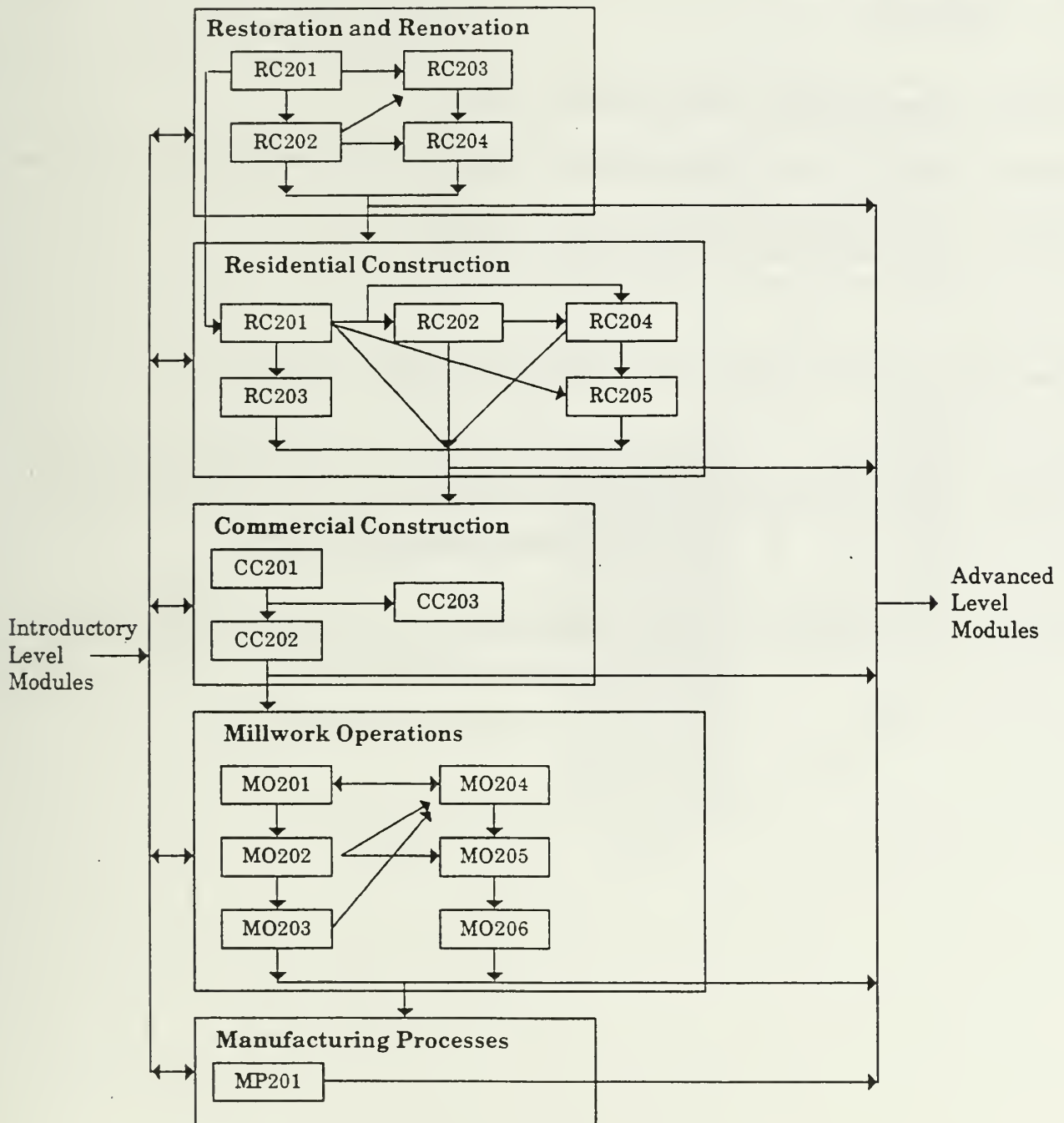
5	6
Residential Systems RR201 Restoration Skills RR203	Residential Wiring RR202 Furniture Repair RR204 Furniture Refinishing RR205
Floor Framing RC201 Residential Wall Framing RC202 Interior Wall Finishing RC204	Wall Framing Project RC203 Interior Trim Finishing RC205 Interior Finishing Project RC206
Introduction to Commercial Construction CC201	Commercial Interior Finishing CC202 Floor Finishes CC203
Millwork Procedures MO201 Furniture Millwork MO204 Wood-Turning Operations MO206	Millwork Assembly and Finishing MO202 Millwork Project MO203 Furniture Project MO205
Manufacturing Systems Design MP201	
	Construction Technologies Innovations AC201

INCREASING DEGREE OF CHALLENGE/COMPETENCY



Sample Classroom Programs: Intermediate Level

The following schematic illustrates possible combinations of intermediate level modules in this strand.



The following examples suggest a variety of module combinations that maybe offered in intermediate level Construction Technologies.

Note: The examples assume the student has successfully completed or challenged all required prerequisites.

Sample 1 **MO201** **MO202** **MO203** **MO205** **MP201**

Sample 2 **MP201** **MO201** **MO202** **MO204** **MO205**

Sample 3 **RC201** **RC202** **RC204** **CC201** **CC202**

Other programming options may include mixing modules from two or more strands.

Sample 4 **MP201** **Creating a Tool Plot Path** **CAD CAM 1** **CAD CAM 2** **Automated Tools**

(Construction Technologies and Fabrication Studies)

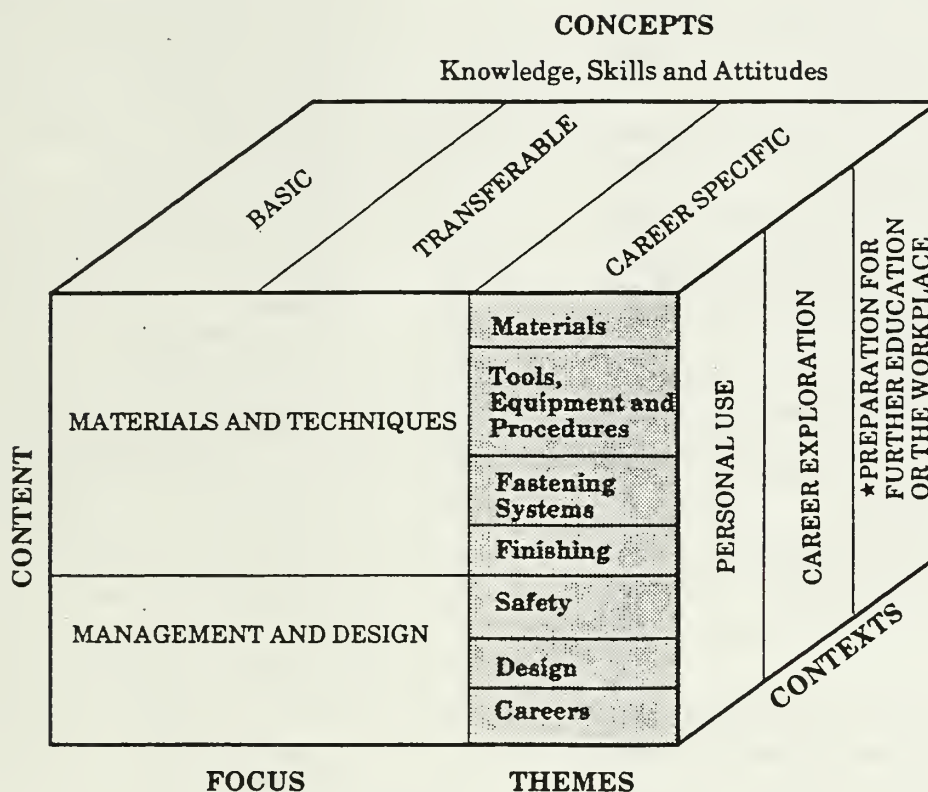
Sample 5 **MO201** **MO204** **MO205** **3-D Applications** **Drafting Design Applications**

(Construction Technologies and Design Studies)

Advanced Level Modules

Advanced level modules are designed for students who have successfully demonstrated the required competencies of the introductory and intermediate level modules. Most students in these modules will be about 16 to 17 years old. Some advanced level modules have prerequisites.

Development Model: Advanced Level



★ Indicates emphasis at this level.

Levels Progression: Advanced Modules

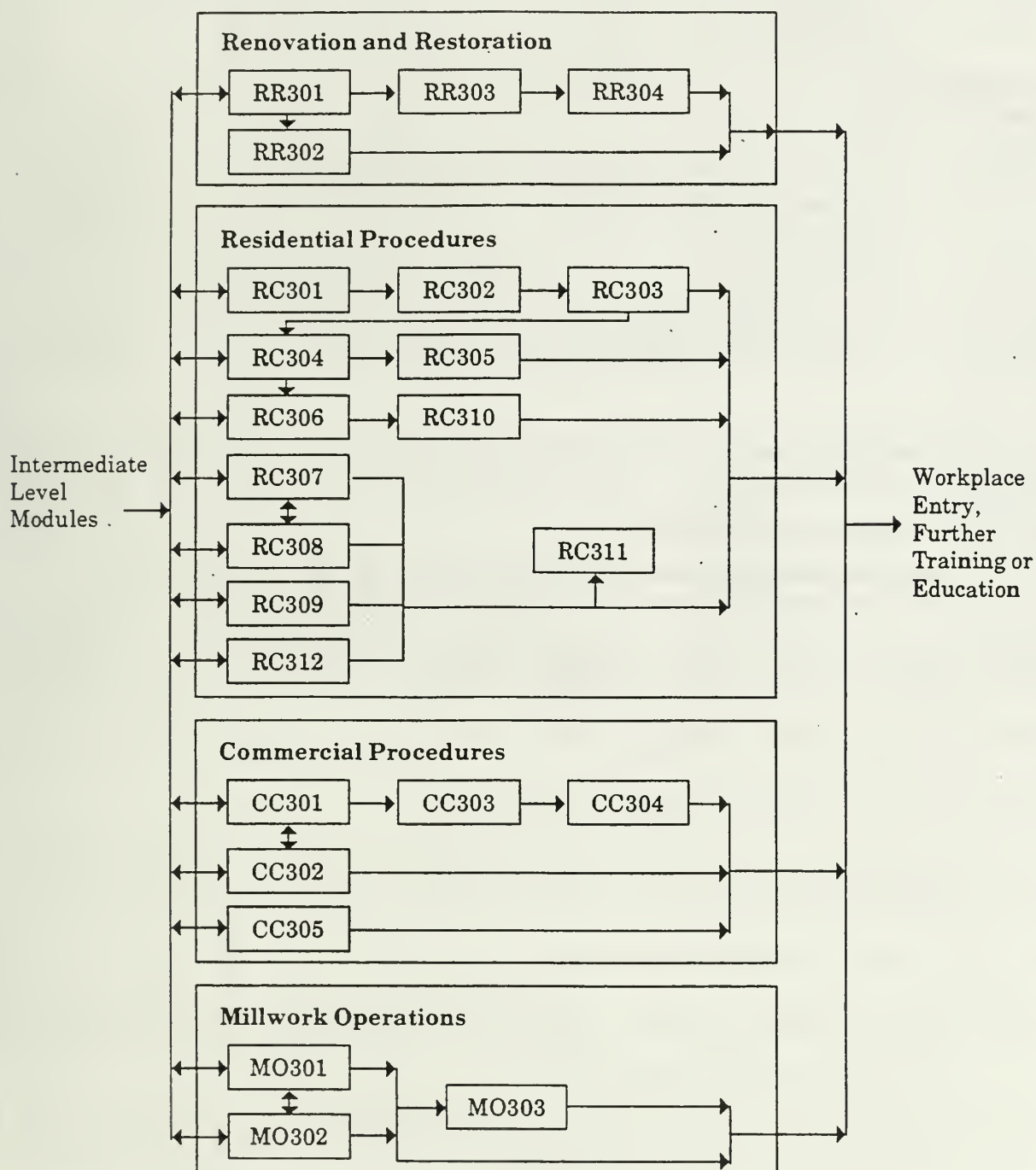
7	8
Historical Restoration RR301 Furniture Restoration RR302	Building Renovation Practices RR303 Building Renovation Project RR304
Site Preparation RC301 Residential Concrete Foundations RC202 Preserved Wood Foundations RC303 Roof Framing RC304 Advanced Framing Project RC305 Stair Design and Construction RC306	Siding Finishes RC307 Masonry Finishes RC308 Installing Prefabricated Units and Trim RC309 Roof Finishing RC310 Exterior Finishing Project RC311 Energy Efficient Housing Design RC312
Commercial Exterior Finishes CC301 Concrete Work CC302	Elements of Commercial Construction CC303 Site Management CC304 Building Maintenance CC305
Advanced Cabinetry MO301 Furniture Building MO302	Advanced Millwork Project MO303
Planning Production MP301 Creating a Production Line MP302	Production Project MP303 Production Management MP304
Construction Technologies Design AC301	Construction Technologies Production AC302

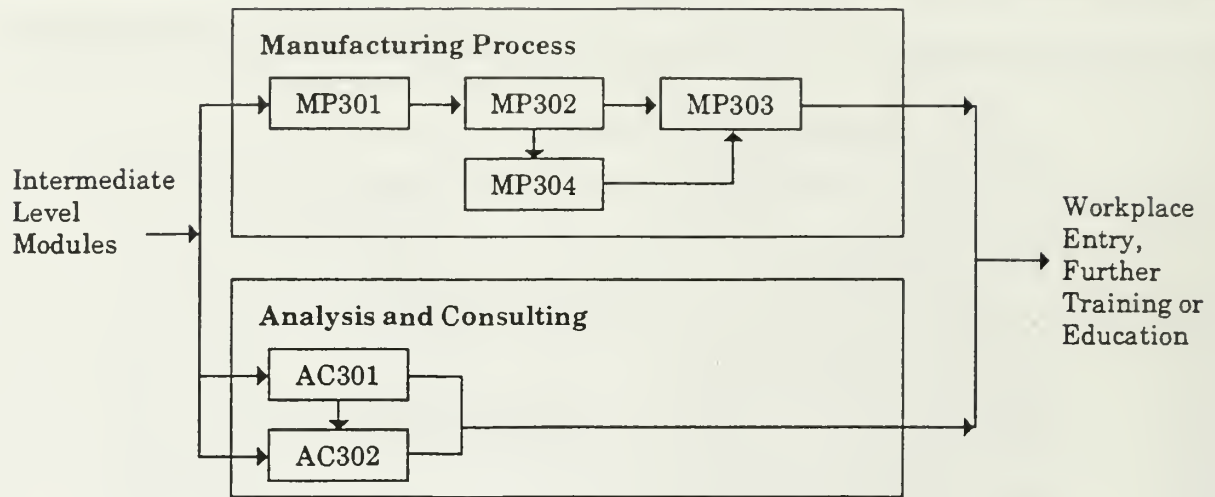
INCREASING DEGREE OF CHALLENGE/COMPETENCY



Sample Classroom Programs: Advanced Level

The following schematic illustrates possible combinations of advanced level modules in this strand.





The following examples suggest a variety of module combinations that maybe offered in advanced level Construction Technologies.

Note: The examples assume the student:

- has the required prerequisite modules at the introductory and advanced levels
- wants to specialize in Construction Technologies.

Sample 1	RR301	RR303	RR304	MO301	AC301
Sample 2	RC301	RC302	RC303	RC304	RC305
Sample 3	MP301	MP302	MP303	MP304	AC302
Sample 4	CC303	CC304	RC301	AC301	AC302

Other programming options may include mixing two or more strands.

Sample 7	RR301	RR303	RR304	Form, Function, Aesthetics	3-D Design
	Construction Technologies, Living Environments				
Sample 8	MP301	MP302	MP303	Automated Tools	Management and Marketing Research
	Construction Technologies, Fabrication Studies				
Sample 9	CC303	CC304	AC302	Managing the Venture	Management and Marketing
	Construction Technologies, Enterprise and Innovation				

SCOPE AND SEQUENCE CHART

INTRODUCTORY 100 Series	INTERMEDIATE 200 Series	ADVANCED 300 Series	
CFS101 Introduction to Construction and Fabrication Studies	Residential Systems RR201 Residential Wiring RR202 Restoration Skills RR203 Furniture Repair RR204 Furniture Refinishing RR205	Historical Restoration RR301 Furniture Restoration RR302 Building Renovation Practices RR303 Building Renovation Project RR304	Renovation and Restoration
GT102 Project Planning and Assembly	Floor Framing RC201 Residential Wall Framing RC202 Framing Project RC203 Interior Wall Finishing RC204 Interior Trim Finishing RC205 Interior Finishing Project RC206	Site Preparation RC301 Residential Concrete Foundations RC302 Preserved Wood Foundations RC303 Roof Framing RC304 Advanced Framing Project RC305 Stair Design and Construction RC306 Siding Finishes RC307 Masonry Finishes RC308 Installing Pre-fabricated Units and Trim RC309 Roof Finishing RC310 Exterior Finishing Project RC311 Energy Efficient Housing Design RC312	Residential Procedures
GT103 Combining Materials in Production	Introduction to Commercial Construction CC201 Commercial Interior Finishing CC202 Floor Finishes CC203	Commercial Exterior Finishes CC301 Concrete Work CC302 Elements of Commercial Construction CC303 Site Management CC304 Building Maintenance CC305	Commercial Procedures
GT104 Prototype Design for Production	Millwork Procedures MO201 Millwork Assembly and Finishing MO202 Millwork Project MO203 Furniture Millwork MO204 Furniture Project MO205 Wood-Turning Operations MO206	Advanced Cabinetry MO301 Furniture Building MO302 Advanced Millwork Project MO303	Millwork Operations
GT105 Mass Production	Manufacturing Systems Design MP201	Planning Production MP301 Creating a Production Line MP302 Production Project MP303 Production Management MP304	Manufacturing Processes
GT106 Fabrication with Synthetics	Construction Technologies Innovations AC201	Construction Technologies Design AC301 Construction Technologies Production AC302	Analysis and Consulting
GT107 Recycling and Repair Procedures			
GT108 Mold Making and Casting			

MODULE DESCRIPTIONS

Introductory Level

Module CFS101: Introduction to Construction Fabrication Studies

The student participates in an orientation to the basic materials and processes associated with Construction Technologies and Fabrication Studies. Students produce two or more projects using a different material. Project materials may include woods, synthetics, earths or metals.

Module CT102: Project Planning and Assembly

The student draws or modifies plans for a project with multiple part joints, and then cuts out, assembles and finishes the project.

Module CT103: Combining Materials in Production

The student designs, lays out, cuts out, assembles and finishes a project that incorporates two or more different types of materials and techniques from Construction Technologies or another CTS strand.

Module CT104: Prototype Design for Production

The student works individually or as a team member to select and design a simple, marketable product made with techniques and materials familiar to the group. A prototype of the product is made to test out the design and procedure.

Module CT105: Mass Production

The student works as a team member to manage the production and marketing of a product made by students in another module.

Module CT106: Fabrication with Synthetics

The student lays out, cuts out and assembles simple projects made of synthetic materials. The emphasis is upon acrylic fabrication but other processes may be used if appropriate and available.

Module CT107: Recycling and Repair Procedures

The student identifies, plans and completes a suitable project(s) for repair and recycling. Materials may include woods, synthetics or earths.

Module CT108: Mold Making and Casting

The student designs, makes and uses a mold to form a product related to Construction Technologies. The initial prototype may be made of slip or another suitable material. The prototype is used to indicate necessary mold improvements before a final pour with concrete or other suitable materials.

Intermediate Level

Module RR201: Residential Systems

The student is introduced to the support systems commonly found in a residential dwelling. Topics include the construction, operation and maintenance of plumbing, drainage, electrical, heating and cooling systems.

Module RR202: Residential Wiring

The student applies electrical system principles and installation procedures. Tasks and examples relate to residential home systems only.

Module RR203: Restoration Skills

The student identifies and applies the skills and techniques historically used in the construction of wooden and earthen materials. Projects use past or present technologies suited to restoration projects.

Module RR204: Furniture Repair

The student identifies materials, repairs components, and replaces or fabricates components and reassembles furniture, using original or current technology.

Module RR205: Furniture Refinishing

The student identifies and uses techniques in the restoration of hard finishes of furniture. Tasks involve identification of furniture finishes, surface repairs and application of new finishes.

Module RC201: Floor Framing

The student plans, lays out and constructs wooden floor framing and sheathing. Wood and metal support beam purpose and installation are also addressed.

Module RC202: Residential Wall Framing

The student is introduced to construction of residential wood framing structures. Tasks focus on wall framing for practical applications.

Module RC203: Wall Framing Project

The student applies his or her framing skills in the context of a residential construction site. Outcomes include practical skill development and recognition of the realities and responsibilities of the job site.

Module RC204: Interior Wall Finishing

The student estimates and installs insulation, barriers and gypsum wall board. Insulation techniques address all common forms of materials. Barriers include air and vapour membranes. Wall board techniques will include installation, filling and sanding.

Module RC205: Interior Trim Finishing

The student will applies and installs final trim finishes for walls and floors. Wall applications include window, door and baseboard moldings, wall coverings, painting and paneling. Floor applications include wood, ceramic and textile floor materials.

Module RC206: Interior Finishing Project

The student applies interior finishing skills in a local residential building. Tasks may include installation of cabinets, and wall and floor finishing materials.

Module CC201: Introduction to Commercial Construction

The student identifies the materials, practices and operation of the commercial construction industry. Topics include differences between residential and commercial projects, scope and typical organizational structures in the industry and general practices; e.g., rigging, form construction, scaffold assembly.

Module CC202: Commercial Interior Finishing

The student identifies and uses metal stud framing and interior surface finishing techniques. Finishing tasks include installation and finishing of walls and ceilings; e.g., prefinished panels and spray finishes.

Module CC203: Floor Finishes

The student selects and applies floor finishes used in building. Materials studied include common residential and commercial varieties.

Module MO201: Millwork Procedures

The student is introduced to basic practices of millwork. Projects include planning, construction and finishing a small millwork project; e.g., bench top router table, vanity cabinet.

Module MO202: Millwork Assembly and Finishing

The student applies techniques associated with final cabinet assembly, finishing and installation.

Module MO203: Millwork Project

The student applies previous millwork skills on or off campus. Tasks include planning, layout construction and assembly in an effective, efficient manner.

Module MO204: Furniture Millwork

The student identifies and applies the theory and practices associated with furniture making. Tasks include using jigs, furniture design, veneering and construction using a variety of joints.

Module MO205: Furniture Project

The student applies previous furniture-making skills on or off campus. Tasks include planning, layout, construction and assembly in an effective, efficient manner. Quality control must include accuracy, aesthetics and effective operations.

Module MO206: Wood-Turning Operations

The student applies all aspects of wood-turning operations for custom or production work.

Module MP201: Manufacturing Systems Design

The student is introduced to the current approaches to manufacturing and how they are applied in the industry. Topics include materials, processes, quality control and process management.

Module AC201: Construction Technologies Innovations

The student prepares and produces a research report and display and/or presentation on one or more innovative practices or procedures in Construction Technologies.

Advanced Level

Module RR301: Historical Restoration

The student identifies traditional materials and techniques used to produce a structure/feature. The restoration of this project includes the use of traditional and/or current technology and appropriate materials.

Module RR302: Furniture Restoration

The student repairs, restores and refinishes a piece of furniture using traditional and/or current techniques and appropriate materials.

Module RR303: Building Renovation Practices

The student analyzes a building for requirements and feasibility of restoration. The restoration tasks include original material and techniques identification, safe repair and refinishing techniques and updating the structure to the Building Code where required.

Module RR304: Building Renovation Project

The student works as a team member to renovate a structure according to a plan and related Building Code requirements.

Module RC301: Site Preparation

The student performs preliminary building site layout tasks and investigates the excavation and shoring processes.

Module RC302: Residential Concrete Foundations

The student undertakes tasks related to the preparation and construction of a concrete residential foundation.

Module RC303: Preserved Wood Foundations

The student undertakes tasks related to the preparation and construction of a preserved wood foundation.

Module RC304: Roof Framing

The student describes and constructs roof framing to design and Building Code requirements.

Module RC305: Advanced Framing Project

The student lays out and constructs framing project according to design and Building Code requirements.

Module RC306: Stair Design and Construction

The student identifies and describes characteristics of stair design before performing related calculations for stair requirements. A set of straight flight stairs is to be constructed to design and Building Code requirements.

Module RC307: Siding Finishes

The student identifies and installs metal, vinyl, and/or wood siding according to design and Building Code requirements.

Module RC308: Masonry Finishes

The student calculates the mortar mix before constructing/applying stucco and/or brick finishes.

Module RC309: Installing Prefabricated Units and Trim

The student installs windows and/or door units and required trim.

Module RC310: Roof Finishing

The student identifies and installs roof finishing that may include asphalt shingles, cedar shakes and shingles, metal panels and shingles and/or ceramic roof tiles.

Module RC311: Exterior Finishing Project

The student completes exterior finishing tasks to industry standards while at a work site.

Module RC312: Energy Efficient Housing Design

The student investigates practices and materials related to energy efficient housing design. Selected practices are to be demonstrated on a model, display, shop project and/or work site.

Module CC301: Commercial Exterior Finishes

The student identifies and describes common exterior wall finishes and installs/applies selected finishes in a work site and/or simulated situation.

Module CC302: Concrete Work

The student describes and calculates concrete requirements before placing and curing concrete.

Module CC303: Elements of Commercial Construction

The student identifies and describes common structural members and what practices are required to construct them. Easy-strip and snap-tie forms are to be constructed to simulate preparation processes. Roofing systems and installation procedures are to be identified and described.

Module CC304: Site Management

The student identifies and investigates construction site management and job roles as part of a work-site observation activity.

Module CC305: Building Maintenance

The student identifies building support systems and performs maintenance tasks related to heating, cooling, electrical and/or piping systems.

Module MO301: Advanced Cabinetry

The student lays out, constructs and/or finishes and installs cabinets.

Module MO302: Furniture Building

The student undertakes tasks related to furniture design, construction and finishing.

Module MO303: Advanced Millwork Project

The student lays out, constructs and finishes an advanced millwork project.

Module MP301: Planning Production

The student identifies local resources and constraints, conducts a market survey, selects and designs a product for manufacturing and produces a prototype of the project.

Module MP302: Creating a Production Line

The student selects an appropriate production procedure and then plans and constructs a production line for the selected product.

Module MP303: Production Project

The student works as a cooperative team member to produce a preplanned product on a predesigned and constructed production line.

Module MP304: Production Management

The student manages and monitors the production team and process using available resources.

Module AC301: Construction Technologies Design

The student investigates and reports on the design history and attributes of a structure or object related to Construction Technologies.

Module AC302: Construction Technologies Production

The student investigates and reports on the procedure and attributes of a production process related to Construction Technologies.

C. CURRICULUM AND ASSESSMENT STANDARDS

CURRICULUM STANDARDS

Curriculum standards are expressed through learner expectations, which describe the competencies that students are expected to develop.

Strand Learner Expectations

Strand learner expectations for Construction Technologies serve as the foundation for each module and each set of specific learner expectations. Within the context of Construction Technologies, *the student will:*

- demonstrate personal use and occupation-related knowledge, skills and attitudes in the school and community environment
- apply relevant knowledge, skills and attitudes from other Career and Technology Studies strands, and academic and optional courses
- link theory to practical applications
- demonstrate relevant knowledge, skills and attitudes related to past, present and emerging technologies
- recognize and demonstrate the use of proper terminology, materials, and tools for tasks
- demonstrate effectiveness, efficiency and persistence to complete assigned or selected projects or tasks
- recognize relevant design and product standards and work-site expectations
- work to personal, work-site and environmental safety standards
- maintain a safe, clean work area
- recognize his or her personal attributes and displays a positive self-concept and image
- recognize career opportunities for avocational and occupational activities
- demonstrate teamwork, human relations skills, creativity, adaptability and motivation
- apply effective and innovative problem-solving strategies in a variety of situations
- demonstrate a tolerance for opinions held by others.

Competency Indicators

In relation to each module, *the student will:*

- complete tasks as assigned
- consistently apply all required personal resources to complete tasks
- apply relevant theory to completion of all tasks
- identify and apply appropriate technology and materials
- consistently use proper terms and techniques
- persistently remain on task to completion of tasks and projects
- make choices for efficiency and effectiveness related to task
- conform to work area expectations and standards
- recognize and conform to all product codes and standards
- consistently follow rules related to personal, environmental, and work-site safety
- independently recognize and correct hazards/problems related to work-site cleanliness
- adhere to clean-up schedule/responsibilities
- confidently approach and complete tasks

- seek assistance when required
- demonstrate an interest in task and understanding of the value of the knowledge, skills and attitudes required
- work cooperatively and constructively with others
- show initiative in problem solving and independence where required
- recognize the similarities between situations
- transfer knowledge, skills and attitude between situation to complete tasks
- show respect for divergent opinion.

Module Learner Expectations

Module learner expectations describe what the student should know and be able to do to successfully complete the module.

Specific Learner Expectations

Specific learner expectations define the scope of learning. They help teachers to organize for instruction to help students achieve the module learner expectations. They are described on pages 25 through 155.

ASSESSMENT STANDARDS

Assessment standards describe the conditions and criteria for determining whether or not students' performance meets the required standards.

MODULE CFS101: INTRODUCTION TO CONSTRUCTION AND FABRICATION STUDIES

Level: Introductory

- Note:
- As this is the first module for both Fabrication Studies and Construction Technologies strands, delivery of this module should introduce students to as many materials (synthetics, metals, woods and earths) as possible with local resources.
 - The student must demonstrate the required safety use procedures prior to using any power tools or equipment.

Module Learner Expectations and Assessment Standards

Module Learner Expectations	Assessment Standards
<i>The student will:</i> ● determine how the properties and shapes of materials can be altered to improve their qualities ● demonstrate safety practices related to tools, equipment, processes and the environment required to produce a product or structure ● operate basic hand and machine tools to transform materials into a small project or structure ● measure, lay out, cut out and assemble one or more projects using two or more materials; i.e., synthetics, metals, woods and earths.	<i>The student will:</i> ● select projects incorporating only simple joints (i.e. butt, lap, seam) ● consistently and sequentially lay out, cut and assemble components according to the directions provided ● demonstrate an awareness and concern for safety through his or her shop performance ● demonstrate safety procedures as they relate to personal, procedural and environmental safety ● produce a product that shall conform to a tolerance of 2 mm for overall dimensions ● produce a finish free of defects and blemishes (e.g., runs, scratches, hammer marks) ● finish to an acceptable standard.

MODULE CFS101: INTRODUCTION TO CONSTRUCTION AND FABRICATION STUDIES
(continued)

Specific Learner Expectations

Concept	Specific Learner Expectations
Materials ● Sources ● Common Forms and Types ● General Properties ● Working Properties ● Structural Considerations ● Measuring and Marking ● Cutting and Shaping ● Project Use	<i>The student will:</i> ● describe the sources of common types of materials ● describe how common materials and products can be turned into new products or structures ● describe the forms that common types of materials are available in ● describe which materials are: – strong and usually heavy – conduct heat and electricity – magnetic – expand when heated ● examine characteristics of materials in relation to: – bending – twisting – shearing – pounding – heating – corrosive materials – moisture – mixing of materials ● describe the effects of a load being placed on a beam, column and tie ● examine and describe what happens to materials that are distorted beyond its maximum elastic limit ● identify ways that a material can be shaped to maximize or enhance strength ● identify and use measuring tools, such as: – rulers – tape measures – scribes – squares – punches – wire and sheet gauges ● identify and safely use: – saws – chisels – files – drills – material specific tools ● recognize recommended materials for projects ● describe materials and processes in standard terminology ● layout and use materials economically ● manipulate materials to minimize damage ● recognize and identify common material defects.

MODULE CFS101: INTRODUCTION TO CONSTRUCTION AND FABRICATION STUDIES
(continued)

Specific Learner Expectations

Concept	Specific Learner Expectations
Tools , Equipment and Procedures	<i>The student will:</i> ● select and use appropriate hand tools and/or equipment ● use accepted techniques to maximize the effectiveness of the hand tools and/or equipment ● use and care for tools and/or equipment properly ● demonstrate the safe use of required equipment, tools and supplies ● follow verbal and/or written directions ● explain the importance of following a logical sequence of directions.
Safety	● follow safety rules and guidelines associated with the tasks and environment in which he or she is working ● identify common hazards associated with the tasks and environment in which he or she is working ● inspect for and recognize common hazards associated with the environment in which he or she is working.
Design	● build the project to given standards in plans ● lay out components from a working drawing and/or template ● select suitable solutions to problems encountered in the process.
Fastening Systems	● identify a suitable fastening system according to the parameters for selection.
Finishing	● produce an appropriate finish.

MODULE CFS101: INTRODUCTION TO CONSTRUCTION AND FABRICATION STUDIES
(continued)

RESOURCES

Chapman, C., and M. Peace. *Design and Realization*. London, UK: Collins Educational, 1991.
ISBN 0-00-322060-5

Ehrlich, J., and M. Mannheimer. *The Carpenter's Manifesto*. New York, NY, USA: Henry Holt and Company, 1990.

Hildebrand, R. *Wood Projects for the Home*. Berkeley, CA, USA: Ortho Books, 1990.
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Williams, T.J. *Basic Carpentry Techniques*. Berkeley, CA, USA: Ortho Books, 1981.
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Zimmerman, F.W., and L.J. McWard. *Exploring Woodworking: Fundamentals of Technology*. South Holland, IL, USA: Goodhart-Wilcox Co. Inc., 1991.
Student Text ISBN 0-87006-840-7
Student Workbook ISBN 0-87006-841-5
Instructor's Guide ISBN 0-87006-842-3

MODULE CT102: PROJECT PLANNING AND ASSEMBLY

Level: Introductory

Module Learner Expectations and Assessment Standards

Module Learner Expectations	Assessment Standards
<i>The student will:</i> ● create or modify simple plans for a woods, synthetics or earths project with multiple part joints ● identify attributes of multiple part joints ● measure, lay out, cut out, assemble and finish the project.	<i>The student will:</i> ★ produce or modify a working drawing of a selected project ★ rationalize joint choice of the selected project (e.g., strength, appearance, suitability) ★ produce a project that shall be consistent with the plan to a tolerance of 2 mm for overall dimensions ● lay out materials to minimize waste and make the most appropriate use of material available ● make cuts in a sequence that will facilitate the safe and efficient use of equipment ● perform operations in a manner that will minimize damage to the material ● sequentially plan all assembly procedures ● select and produce a finish appropriate to the intended function of the project ● finish in a manner that minimizes blemishes.

★ indicates major element for assessment.

Specific Learner Expectations

Concept	Specific Learner Expectations.
Materials	<i>The student will:</i> ● make appropriate material choices based on cost/application ● make material choices based on availability ● lay out and use materials efficiently and economically in the construction of projects.

MODULE CT102: PROJECT PLANNING AND ASSEMBLY(continued)

Concept	Specific Learner Expectations
Tools, Equipment and Procedures	<i>The student will:</i> - properly select and safely use appropriate tools and/or equipment based on the student's ability and project requirements - demonstrate the safe use of required equipment, tools and supplies - use accepted techniques to maximize the effectiveness of the tools and/or equipment - care for tools and/or equipment - perform maintenance to work space
Safety	- consistently use safety rules associated with the tasks and environment in which he or she is working - recognize and remedy hazards in the work area - use WHMIS sheets for identified materials necessary to the completion of the project work.
Design	- identify the characteristics and functions of selected multiple part joints (i.e., lap, dado, rabbet, mitre) - select appropriate multiple part joints for projects - design a project to given standards - build a project to given standards - use metric and imperial systems of measurement - use a template as a layout tool - make a choice based on freehand sketches and turn that choice into a simple working drawing - create a unique design or alter an existing plan to serve a specific purpose, using appropriate technology and techniques - select suitable solutions to problems encountered in the process.
Fastening Systems	- identify a suitable fastening system according to the parameters for selection - produce a joint that is tight fitting, uniform and functional.
Finishing	- describe the sequence of steps required for an appropriate finish - produce a project finish using an appropriate material and technique.

MODULE CT102: PROJECT PLANNING AND ASSEMBLY(continued)

RESOURCES

- Autosketch 3.0, Student Edition* (software produced by Autodesk Inc., Sausalito, CA). Redwood City, CA, USA: Addison-Wesley Publishers, 1991.
Student Edition ISBN 0-201-50617-3
Instructor's Manual ISBN 0-201-50618-1 (IBM platform)
- Caborn, C., I. Mould and J. Cave. *Design and Technology*. Surrey, UK: Thomas Nelson Publishers, 1989.
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MODULE CT103: COMBINING MATERIALS IN PRODUCTION

Level: Introductory

Module Learner Expectations and Assessment Standards

Module Learner Expectations	Assessment Standards
<i>The student will:</i> ● design, lay out, cut out, assemble and finish a project that incorporates two or more different types of materials (woods, synthetics, earths, metals) and techniques from Construction Technologies or another CTS strand.	<i>The student will:</i> ★ design and create a working drawing of a project ★ produce a project that shall be dimensionally consistent to a tolerance of 2 mm for overall dimensions ● incorporate at least two appropriate materials into the design ● lay out materials in a manner that minimizes waste and makes the most appropriate use of material available ● make cuts in a sequence that will facilitate the safe and efficient use of equipment ● perform operations in a manner that will minimize damage to the material ● sequentially plan all assembly procedures ● select and produce a finish that is appropriate to the intended function of the project ● apply a finish in a manner that minimizes blemishes.

★ indicates major element for assessment.

Specific Learner Expectations

Concept	Specific Learner Expectations
Materials	<i>The student will:</i> ● recognize that common objects often incorporate a variety of materials ● recognize that a variety of materials may be used to meet specific needs ● recognize that new materials often replace some traditional materials ● know and use the correct terminology for selected materials, equipment and processes ● handle and “work in” a variety of materials in an efficient fashion.

MODULE CT103: COMBINING MATERIALS IN PRODUCTION(continued)

Concept	Specific Learner Expectations
Tools, Equipment and Procedures	<i>The student will:</i> ● be able to select and use appropriate tools and/or equipment for each project ● demonstrate the safe use of equipment, tools and supplies.
Safety	● consistently use all safety rules associated with the tasks, new materials and environment in which he or she is working.
Design	● use appropriate technology to draw and communicate a practical design that integrates materials and techniques from other strands.
Fastening Systems	● recognize that fastening systems must be appropriate to the materials in the design.
Finishing	● produce a project finish using an appropriate material and technique.

RESOURCES

Autosketch 3.0, Student Edition (software produced by Autodesk Inc., Sausalito, CA). Redwood City, CA, USA: Addison-Wesley Publishers, 1991.
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MODULE CT103: COMBINING MATERIALS IN PRODUCTION(continued)

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Student Text ISBN 0-82734-837-1

Teacher Guide Not Yet Available

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Student Text ISBN 0-87006-840-7

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MODULE CT104: PROTOTYPE DESIGN FOR PRODUCTION

Level: Introductory

Module Learner Expectations and Assessment Standards

Module Learner Expectations	Assessment Standards
<i>The student will:</i> ● work individually or as a team member to select and design a simple, mass producible product made with familiar techniques and materials ● make a prototype of the product to test out the design and procedure.	<i>The student will:</i> ★ design a product suited to mass production ★ produce an accurate working drawing that conforms to accepted drafting standards and accurately represents their product ★ produce a product appropriate to the skill level and resources of the team ★ produce a prototype consistent with the technical drawing to a dimensional tolerance of 2 mm for overall dimensions ● consistently cooperate and be involved at all stages of the project work ● produce a product that is marketable.

★ indicates major element for assessment.

Specific Learner Expectations

Concept	Specific Learner Expectations
Materials	<i>The student will:</i> ● select appropriate materials for making models of prototypes ● lay out and use modelling materials economically.
Tools, Equipment and Procedures	● properly select and safely use appropriate tools and/or equipment for models and prototype production.
Safety	● consistently use all safety rules and guidelines associated with the tasks and environment in which he or she is working ● identify common hazards associated with the materials being used ● inspect for and recognize common hazards associated with the environment in which he or she is working.
Design	● design and build the models and prototypes to given standards ● identify a problem, restate it, provide possible solutions, consider the feasibility of each possible solution and select the best one ● conduct a market feasibility study

MODULE CT104: PROTOTYPE DESIGN FOR PRODUCTION (continued)

Concept	Specific Learner Expectations
Design (continued)	<i>The student will:</i> ● use marketing techniques and processes ● design an appropriate product that has – simple design – material that is easily accessible – suited to easy production – marketable ● use technical drawing techniques.
Fastening Systems	● select a suitable fastening system for the models and prototype according to the parameters for selection; e.g., materials, environment, cost, appearance, strength, project purpose.
Finishing	● produce a suitable finish using appropriate materials and techniques.

RESOURCES

Autosketch 3.0, Student Edition (software produced by Autodesk Inc., Sausalito, CA). Redwood City, CA, USA: Addison-Wesley Publishers, 1991.

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MODULE CT105: MASS PRODUCTION

Level: Introductory

Module Learner Expectations and Assessment Standards

Module Learner Expectations	Assessment Standards
<i>The student will:</i> ● work as a team member to produce, manage and market the production of a product.	<i>The student will:</i> ★ design or build an efficient production line ★ run the production line and market the product ★ produce uniform and aesthetically pleasing products ★ develop a viable and realistic marketing plan or strategy ● develop a product schedule; e.g., time line, sequence of production, and quality control indicators ● accurately describe advantages/disadvantages of a variety of production methods; e.g., line production, unit production and team production ● select appropriate materials for product production ● use a pilot run on the production line to test and refine production sequence.

★ indicates major element for assessment.

Specific Learner Expectations

Concept	Specific Learner Expectations
Materials	<i>The student will:</i> ● identify appropriate materials for the project ● describe materials and processes in standard terminology.
Tools, Equipment and Procedures	● select and safely use appropriate tools and/or equipment ● use accepted techniques to maximize the effectiveness of the tools and/or equipment ● actively participate as a team member in the production and marketing of the product.
Safety	● consistently use all safety rules and guidelines associated with the tasks and environment in which he or she is working ● identify common hazards associated with the materials being used.

MODULE CT105: MASS PRODUCTION (continued)

Concept	Specific Learner Expectations
Design	<i>The student will:</i> ● produce the project to given standards ● assist in the design of an efficient production line ● assist in the project management as directed by the teacher/supervisor ● develop a production schedule ● discuss the advantages and disadvantages of a variety of production methods; e.g., line production, unit production, team production ● discuss current issues related to manufacturing ● work as a team member ● use marketing plan to test and refine marketing strategy ● use a small market survey to test the marketing plan ● sell/presell the product.
Fastening Systems	● install fastening systems properly.
Finishing	● apply the finish using the recommended technique.

RESOURCES

Chapman, C., and M. Peace. *Design and Realization*. London, UK: Collins Educational, 1991.
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MODULE CT106: FABRICATION WITH SYNTHETICS

Level: Introductory

Module Learner Expectations and Assessment Standards

Module Learner Expectations	Assessment Standards
<i>The student will:</i> ● design, lay out, cut out and assemble projects made of synthetic materials ● use synthetic material fabrication techniques ● use other suitable and available processes for making products of synthetic materials.	<i>The student will:</i> ★ produce a functional and/or aesthetically pleasing design ★ produce an acceptable working drawing ★ produce finishing of the product to teacher defined tolerances and original plan ● identify common synthetics for the design/product ● identify common processes using standard terminology ● specify proper tools and equipment to be used for the design and synthetic used ● use appropriate fastening systems ● produce a uniform and aesthetically pleasing finish.

★ indicates major element for assessment.

Specific Learner Expectations

Concept	Specific Learner Expectations
Materials	<i>The student will:</i> ● identify features of each common type of synthetics ● select appropriate materials for projects according to the parameters of selection; e.g., process, suitability for product, availability, student's ability ● describe materials and processes in standard terminology ● lay out and use materials economically.
Tools, Equipment and Procedures	● select and safely use appropriate tools and/or equipment for each project ● use accepted techniques to maximize the effectiveness of the tools and/or equipment ● care for tools and/or equipment properly.

MODULE CT106: FABRICATION WITH SYNTHETICS (continued)

Concept	Specific Learner Expectations
Safety	<i>The student will:</i> ● consistently use all safety rules and guidelines associated with the tasks and environment in which he or she is working ● identify common hazards associated with the environment in which he or she is working ● identify WHMIS program information as it applies to the synthetics used in project fabrication.
Design	● design and/or build the projects to given standards ● identify a good design for the product.
Fastening Systems	● select a suitable fastening system for the projects according to the parameters for selection; e.g., materials, environment, cost, appearance, strength, Building Codes, project purpose.
Finishing	● produce a project finish using appropriate materials and techniques.

RESOURCES

Autosketch 3.0, Student Edition (software produced by Autodesk Inc., Sausalito, CA). Redwood City, CA, USA: Addison-Wesley Publishers, 1991.
Student Edition ISBN 0-201-50617-3
Instructor's Manual ISBN 0-201-50618-1 (IBM platform)

Caborn, C., I. Mould and J. Cave. *Design and Technology*. Surrey, UK: Thomas Nelson Publishers, 1989.
ISBN 0-17-448162-4

Chapman, C., and M. Peace. *Design and Realization*. London, UK: Collins Educational, 1991.
ISBN 0-00-322060-5

Generic CADD, Student Edition (software produced by Autodesk Inc., Sausalito, CA). Redwood City, CA, USA: Addison Wesley Publishers.
Student Edition ISBN 0-201-50622-X
Instructor's Manual ISBN 0-201-50683-1 (Mac platform)

Komacek, S.A. *Production Technology*, New York, NY, USA: Delmar Publishers Inc., 1992.
Student Text ISBN 0-82734-837-1
Teacher Guide Not Yet Available

MODULE CT106: FABRICATION WITH SYNTHETICS (continued)

ADDITIONAL NOTES

Suggestions for Assessment

Identify:

- Can student distinguish between
- Is student able to select
- Able to identify proper procedure.

Examples:

- Distinguish materials (acrylic and PETG thermosetting and thermoplastic)
- Select proper tools (selects correct hammer, selects between course file and smooth file)
- Identifies good design (distinguishes between good and poor design; e.g., pen holder with holes too small for pen or pencil)
- Identifies good finish; e.g., a smooth, nicely finished project vs. project with bubbled surface from too much heat.

Explains:

- Can be written (pen and paper, oral during lab time or during student presentation)
- Student can explain reason for using a specific tool, machine, material, safety precaution, design, or fastening system, or how a particular finish is achieved.

Demonstrates:

- Student demonstrates processes, material selection skills, proper tool and machine use, good working attitude toward safety and tool care.

Evaluations should be an ongoing process. Following are a few examples of some competency indicators which may be helpful:

- Testing—student will write out examples or processes.
- Identification—student will be able to distinguish between thermosetting and thermoplastic, materials, tools/equipment, safe and unsafe situations, designs, fastening systems, finishes, etc.
- Questioning student during lab time (questions about all themes)
- Monitoring—ongoing; e.g., clean up, material selection
- Student self-evaluation—performance and processes
- Teacher evaluation—performance and processes
- Student presentations—could be on all themes.

MODULE CT107: RECYCLING AND REPAIR PROCEDURES

Level: Introductory

Module Learner Expectations and Assessment Standards

Module Learner Expectations	Assessment Standards
<i>The student will:</i> ● select and recycle suitable projects (made of woods, earths and/or synthetics), using available and suitable methods ● repair broken projects, using simple repair techniques.	<i>The student will:</i> ★ identify common materials (e.g., woods, earths, synthetics) that can be recycled ★ produce or repair a functional final product ★ identify processes that can be used to recycle materials ★ demonstrate proper recycle and repair techniques ● identify materials using codes and characteristics ● correctly identify repair techniques ● identify and demonstrate proper safety procedures.

★ indicates major element for assessment.

Specific Learner Expectations

Concept	Specific Learner Expectations
Materials	<i>The student will:</i> ● describe materials and processes in accepted terminology ● identify the problems associated with recycling ● identify the type of material, using code and/or material characteristics ● identify the common names of materials that can be recycled ● identify common articles that are made of recyclable materials.
Tools, Equipment and Procedures	● select and safely use appropriate tools and/or equipment for each project ● use accepted techniques associated with tools and/or equipment required ● care for tools and/or equipment properly.
Safety	● consistently follow all safety rules and guidelines associated with the tasks and environment in which he or she is working ● identify common hazards associated with the environment in which he or she is working ● inspect for and recognize common hazards.

MODULE CT107: RECYCLING AND REPAIR PROCEDURES (continued)

Concept	Specific Learner Expectations
Design	<i>The student will:</i> ● identify the challenges of working with recycled materials ● design a product that is made with recycled materials.
Fastening Systems	● select a suitable mechanical or chemical fastening system for the project.
Finishing	● produce a project finish using appropriate materials and techniques.

RESOURCES

Caborn, C., I. Mould and J. Cave. *Design and Technology*. Surrey, UK: Thomas Nelson Publishers, 1989.

ISBN 0-17-448162-4

Chapman, C., and M. Peace. *Design and Realization*. London. UK: Collins Educational, 1991.

ISBN 0-00-322060-5

Komacek, S.A. *Production Technology*. New York, NY, USA: Delmar Publishers Inc., 1992.

Student Text ISBN 0-82734-837-1

Teacher Guide Not Yet Available

ADDITIONAL NOTES

Information Sources

- Alberta Environment, Edmonton and Calgary.
- Alberta Environment, Department of Waste Management, Edmonton and Calgary.
- Alberta Plastics Recycling Association, Edmonton.
- Applied Polymer Research, Edmonton.
- Canada Safeway, Calgary.
- Canadian Polystyrene Recycling Association, Mississauga, Ontario.
- The Council for Solid Waste Solutions, Washington, D.C.
- Dow Chemicals, Edmonton.
- Northern Alberta Institute of Technology, Edmonton.
- Novacor Chemicals, Calgary.

MODULE CT107: RECYCLING AND REPAIR PROCEDURES (continued)

- Polymont Plastics Corp., Red Deer.
- The Society of the Plastics Industry of Canada, Don Mills, Ontario.
- Superwood Western Ltd., Edmonton.

Suggestions for Assessment

Identify:

- Can student distinguish between
- Is student able to select
- Able to identify proper procedure.

Examples:

- Distinguish materials (acrylic and PETG, thermosetting and thermoplastic)
- Select proper tools (selects correct hammer, selects between course file and smooth file)
- Identifies good design (distinguishes between good and poor design; e.g., pen holder with holes too small for pen or pencil)
- Identifies good finish; e.g., a smooth, nicely finished project vs. project with bubbled surface from too much heat.

Explains:

- Can be written (pen and paper, oral during lab time or during student presentation)
- Student can explain reason for using a specific tool, machine, material, safety precaution, design, or fastening system, or how a particular finish is achieved.

Demonstrates:

- Student demonstrates processes, material selection skills, proper tool and machine use, good working attitude toward safety and tool care.

Evaluations should be an ongoing process. Following are a few examples of some competency indicators that may be helpful.

- Testing—student will write out examples or processes
- Identification—student will be able to distinguish between: thermosetting and thermoplastic, materials, tools/equipment, safe and unsafe situations, designs, fastening systems, finishes, etc.
- Questioning student during lab time (questions about all themes)
- Monitoring—ongoing; e.g., clean up, material selection
- Student self-evaluation—performance and processes
- Teacher evaluation—performance and processes
- Student presentations—could be on all themes.

MODULE CT108: MOLD MAKING AND CASTING

Level: Introductory

Module Learner Expectations and Assessment Standards

Module Learner Expectations	Assessment Standards
<i>The student will:</i> ● design, create and use a mold to form a product related to Construction Technologies ● use a prototype casting process to test and refine the mold ● pour the finished product from the mold using concrete or other suitable materials.	<i>The student will:</i> ★ design a mold with easy release features such a multiple part design and/or tapered sided where possible ★ produce a mold that is accurate to teacher defined tolerances and the original plan, and contains smooth pour surfaces, tight joints and a design that avoids air pockets or difficult to release areas ★ produce a final product that is uniform and free of surface flaws or defects ● select a product that shows a relationship to Construction Technologies ● draw the mold on a working drawing that contains dimensions and labels ● describe the mold in proper terminology (e.g., permanent Vs expendable, gravity or pressure feed) and describe the casting process in steps that will include planning, pattern production, mold making, pouring, casting removal, and curing/finishing ● describe and demonstrate the typical mold-making procedures (e.g., plan drawing, pattern creation) if the mold is poured ● select and prepare the materials appropriate to the product ● demonstrate a test pour to determine the quality of the mold; e.g., no mold surface flaws or areas that trap the casting.

★ indicates major element for assessment.

Specific Learner Expectations

Concept	Specific Learner Expectations
Materials	<i>The student will:</i> ● identify and select the appropriate materials for projects given the parameters of selection; e.g., process, suitability for product, availability, student's ability ● describe the materials and processes using standard terminology ● use standard layout and forming techniques ● identify common materials and mixtures used in molding and casting

MODULE CT108: MOLD MAKING AND CASTING (continued)

Concept	Specific Learner Expectations
Materials (continued)	<i>The student will:</i> ● identify materials used to produce precast components ● identify common examples of precast components for each type of material ● identify cast or molded products used in the Construction Technologies areas.
Tools, Equipment and Procedures	● select the appropriate tools or equipment for each project ● use accepted techniques and maximize the effectiveness of the tools and equipment used ● demonstrate care in the use of maintenance of the tools and/or equipment ● describe features of commonly used molds ● identify each type of molding process ● use standard layout or forming techniques to produce precast components.
Safety	● use proper safety procedures in the handling of tools, equipment and materials ● identify hazards associated with the environment in which he or she is working.
Design	● design and produce a mold ● design and produce a project to given standards ● identify and describe molds used for production in various environments; e.g., home workshops, repair industry, manufacturing ● identify molding steps ● identify concrete precast applications and structures in the community.
Fastening Systems	● identify fastening systems used in molded products ● select a suitable fastening system ● identify fastening systems used in large-scale precast products ● use a suitable fastening system for a project.
Finishing	● produce an appropriate finish for the project.

RESOURCES

- Autosketch 3.0, Student Edition* (software produced by Autodesk Inc., Sausalito, CA). Redwood City, CA, USA: Addison-Wesley Publishers, 1991.
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Instructor's Manual ISBN 0-201-50618-1 (IBM platform)
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- Komacek, S.A. *Production Technology*. New York, NY, USA: Delmar Publishers Inc., 1992.
Student Text ISBN 0-82734-837-1
Teacher Guide Not Yet Available

MODULE RR201: RESIDENTIAL SYSTEMS

Level: Intermediate

Module Learner Expectations and Assessment Standards

Module Learner Expectations	Assessment Standards
<i>The student will:</i> ● address the basic theories of construction and operation, and the maintenance tasks associated with support systems in residential homes.	<i>The student will:</i> ● demonstrate knowledge of the theories related to support systems in residential homes by passing a teacher developed exam ● apply the theories of construction, operation and maintenance as they relate to residential systems through the performance of one basic construction task, one repair task, and one special maintenance task either actual or simulated ● complete tasks to industry standards/code ● correctly identify the components and functions of common plumbing, drainage, electrical, heating and cooling systems ● identify information sources related to residential systems ● identify common materials, tools, equipment and procedures required for tasks ● perform basic trouble-shooting operations related to residential systems.

Specific Learner Expectations

Concept	Specific Learner Expectations
Materials	<i>The student will:</i> ● identify: – metal and synthetic piping for residential piping – metal and synthetic electrical products for residential circuitry – metal and synthetic products for residential heating and cooling systems ● identify the systems in a local building or residence.
Tools, Equipment and Procedures	● safely perform basic construction, repair and maintenance tasks associated with residential systems.

MODULE RR201: RESIDENTIAL SYSTEMS (continued)

Concept	Specific Learner Expectations
Safety	<i>The student will:</i> ● describe regulations pertaining to installation and maintenance of these systems ● describe hazards associated with each system ● identify related WHMIS symbols and materials ● safely demonstrate proper handling procedures for hazardous materials.
Design	● describe the purpose and operation of each system ● identify mechanical plan symbols ● identify electrical plan symbols.
Fastening Systems	● identify common fastening systems used in each system.
Finishing	● demonstrate finishing to minimum code standards.
Careers	● identify occupations associated with these systems.

MODULE RR202: RESIDENTIAL WIRING

Level: Intermediate

Module Learner Expectations and Assessment Standards

Module Learner Expectations	Assessment Standards
<i>The student will:</i> ● apply basic electrical system principles and wiring procedures as they apply to residential systems.	<i>The student will:</i> ● identify components of common residential electrical circuits ● identify qualifications/training required for tasks ● identify the process of obtaining an electrical permit ● describe a circuit after reviewing an electrical blueprint ● identify specifications related to installation of common electrical components ● describe the attributes of series and parallel circuits as they apply to residential wiring ● perform basic trouble-shooting tasks ● install basic circuits using code that conforms in all ways to electrical codes ● describe innovations related to residential circuits.

Specific Learner Expectations

Concept	Specific Learner Expectations
Materials	<i>The student will:</i> ● identify common wiring materials ● identify the purpose and design of common conductors ● identify and describe types of outlets, boxes, fixtures and switches used in wiring homes.
Tools, Equipment and Procedures	● identify and safely demonstrate the installation techniques for basic circuits ● identify and safely demonstrate the use of electrical specialty tools and testing equipment ● explain methods of mounting various electrical components in homes.

MODULE RR202: RESIDENTIAL WIRING (continued)

Concept	Specific Learner Expectations
Safety	<i>The student will:</i> ● identify tasks that must be performed by a journey person ● identify and demonstrate basic safety rules and procedures associated with electrical systems ● describe the purpose of the Electrical Code and apply it to all relevant tasks ● describe and demonstrate the process of electrical permit application and inspection.
Design	● in relation to residential wiring, describe: – series versus parallel circuiting – relationship of voltage, current and resistance – requirements for conductors and insulators ● identify common residential circuits ● read wiring diagrams ● sketch wiring diagrams ● identify current developments in “Smart House” systems.
Fastening Systems	● use mechanical fasteners for circuits.
Finishing	● install cover plates.
Careers	● describe tasks and jobs associated with circuits: – installation – inspection ● describe the purpose and process of electrical permits ● identify and describe careers associated with residential wiring, fibre optics, telecommunication and “Smart” systems.

MODULE RR203: RESTORATION SKILLS

Level: Intermediate

Module Learner Expectations and Assessment Standards

Module Learner Expectations	Assessment Standards
<i>The student will:</i> ● study the skills and techniques used in historical renovation project(s) ● demonstrate techniques required in restoration projects.	<i>The student will:</i> ● identify and describe techniques used in historical renovations ● complete a project using techniques appropriate to the renovations tasks and skill level of the student ● identify materials that affect the procedures required ● demonstrate splining, veneering or production of components as required.

Specific Learner Expectations

Concept	Specific Learner Expectations
Materials	<i>The student will:</i> ● identify common traditional materials in a project ● describe and demonstrate material matching and replacement.
Tools, Equipment and Procedures	● demonstrate splining, veneering and production of replacement components ● identify procedures for joining wooden and plastic moldings ● safely complete a small restoration project.
Safety	● identify hazards associated with restoration projects.
Design	● identify why original materials were used.
Fastening Systems	● identify traditional fastening systems.
Finishing	● identify traditional finishes and their hazards ● identify suitable refinishing processes.
Careers	● identify career opportunities in restoration.

MODULE RR204: FURNITURE REPAIR

Level: Intermediate

Module Learner Expectations and Assessment Standards

Module Learner Expectations	Assessment Standards
<i>The student will:</i> ● demonstrate tasks related to the repair of furniture.	<i>The student will:</i> ● select an appropriate project within the local constraints of time, facilities and materials ● accurately assess the original piece ● complete a furniture repair project that involves remanufacture and replacement of parts ● produce a finished project that closely resembles the original piece.

Specific Learner Expectations

Concept	Specific Learner Expectations
Materials	<i>The student will:</i> ● identify the original materials used; e.g., wood, metals, synthetics, natural materials ● identify the characteristics and attributes of original and replacement materials.
Tools, Equipment and Procedures	● demonstrate the safe use of original technology and/or current technology.
Safety	● identify and set up proper ventilation ● identify hazardous materials; e.g., lead ● investigate and comply with relevant legislation ● use appropriate protective clothing ● identify and demonstrate proper storage techniques for repairing materials.
Design	● determine the feasibility of the project ● select appropriate materials and techniques.
Fastening Systems	● identify and/or repair, produce or replace fasteners.

MODULE RR204: FURNITURE REPAIR (continued)

Concept	Specific Learner Expectations
Finishing	<i>The student will:</i> ● complete finishing tasks as required.
Careers	● identify opportunities associated with furniture repair.

MODULE RR205: FURNITURE REFINISHING

Level: Intermediate

Module Learner Expectations and Assessment Standards

Module Learner Expectations	Assessment Standards
<i>The student will:</i> ● refinish hard surfaces of furniture.	<i>The student will:</i> ● select an appropriate project given local constraints of time, facilities and materials ● remove original finish without damage ● refinish at least two pieces of furniture (Note: The projects chosen should be of different original finishes; e.g., stained wood, painted wood, painted metals, arborited surfaces) ● complete a project using skills and techniques consistent with the furniture refinishing industry.

Specific Learner Expectations

Concept	Specific Learner Expectations
Materials	<i>The student will:</i> ● identify the original surface finish(es).
Tools, Equipment and Procedures	● identify the original application method of the old finish(es).
Safety	● identify and set up proper ventilation ● identify hazardous materials; e.g., lead ● investigate and comply with relevant legislation ● use appropriate protective clothing ● identify and demonstrate proper storage techniques for refinishing materials.
Design	● select appropriate material and technique; e.g., usability and aesthetics).
Fastening Systems	● identify and/or replace fastening systems.

MODULE RR205: FURNITURE REFINISHING (continued)

Concept	Specific Learner Expectations
Finishing	<i>The student will:</i> ● safely remove old finishes ● prepare surface for new finish ● safely apply new finishes.
Careers	● identify opportunities and requirements for careers in furniture refinishing.

MODULE RC201: FLOOR FRAMING

Level: Intermediate

Module Learner Expectations and Assessment Standards

Module Learner Expectations	Assessment Standards
<i>The student will:</i> ● design and build floor framing systems ● demonstrate levelling and squaring floor framing.	<i>The student will:</i> ● identify common floor framing terms and components ● identify and comply with Building Code sections that apply to floor framing ● identify and read floor plans and related specification sheets ● develop a material cutting list and estimates ● draw detailed floor plans to specifications identified by the teacher ● describe and lay out joists for a floor system ● identify and describe common floor framing systems ● identify and use proper framing fasteners ● demonstrate squaring and levelling techniques.

Specific Learner Expectations

Concept	Specific Learner Expectations
Materials	<i>The student will:</i> ● identify common materials used in floor framing ● describe the use of steel beams and open truss systems ● describe the use of built-up wood beams ● describe floor frame sheathing ● describe the species and grades of common framing lumber ● describe the procedures for storing common framing lumber.
Tools, Equipment and Procedures	● lay out a floor joist header from a given plan ● lay out a built-up beam from a given plan ● lay out and cut cross bridging ● describe procedures for framing around openings ● install floor joists and joist restraints.
Safety	● identify and demonstrate floor framing safety practices.

MODULE RC201: FLOOR FRAMING (continued)

Concept	Specific Learner Expectations
Design	<i>The student will:</i> ● describe functions of the floor frame members ● use and interpret span tables from the Alberta Building Code to find beam, beam support, joist, truss and subfloor sheathing material requirements ● demonstrate procedures used in estimating residential floor framing ● complete a residential floor framing estimate.
Fastening Systems	● identify the types, spacing and use of mechanical and adhesive fastening systems.
Careers	● identify opportunities and requirements for careers in floor framing.

MODULE RC202: RESIDENTIAL WALL FRAMING

Level: Intermediate

Module Learner Expectations and Assessment Standards

Module Learner Expectations	Assessment Standards
<i>The student will:</i> ● lay out and build walls incorporating common framing systems for walls and partitions ● build a framing project that is square and plumb to design tolerances.	<i>The student will:</i> ● identify common wall framing terms and components on a residential blueprint ● identify and comply with Building Code sections that apply to wall framing ● identify and read floor plans, building sections and related specification sheets ● sketch details of wall framing and develop a material cutting list ● describe and lay out plates for interior and exterior walls to industry standards ● identify and use proper framing fasteners ● demonstrate placement, squaring and plumb techniques for framing.

Specific Learner Expectations

Concept	Specific Learner Expectations
Materials	<i>The student will:</i> ● identify, describe, recognize and classify common framing materials ● identify flaws related to growth or milling ● select suitable framing materials for a project.
Tools, Equipment and Procedures	● identify suitable tools and equipment for framing tasks ● identify proper adjustment and maintenance for relevant tools and equipment.
Safety	● demonstrate safe lifting and carrying techniques ● demonstrate the current application and safe use of appropriate power tools and equipment ● maintain a safe work area ● select and wear appropriate clothing.

MODULE RC202: RESIDENTIAL WALL FRAMING (continued)

Concept	Specific Learner Expectations
Design	<i>The student will:</i> ● identify common wall framing terms and components ● identify the components of residential blueprints ● identify Building Code sections that apply to framing ● identify and read floor plans, building sections and related specification sheets ● sketch details of wall framing ● describe platform framing ● develop a cutting list for a framing project ● describe plate layout for interior and exterior walls ● lay out plates.
Fastening Systems	● identify and use appropriate framing fasteners.
Careers	● identify occupations that require framing skills ● describe apprenticeship and trade certification procedures.

MODULE RC203: FRAMING PROJECT

Level: Intermediate

Module Learner Expectations and Assessment Standards

Module Learner Expectations	Assessment Standards
<i>The student will:</i> ● experience on-site construction of framing ● observe and follow time lines, standards and expectations common on work sites.	<i>The student will:</i> ● identify common framing terms, materials and components ● comply with Building Code sections that apply to framing ● read and comply with plans, building sections and related specification sheets ● demonstrate efficient performance within expectations of work-site supervisor ● describe work-site occupations and roles.

Specific Learner Expectations

Concept	Specific Learner Expectations
Materials	<i>The student will:</i> ● identify materials for wooden, metal and synthetic framing.
Tools, Equipment and Procedures	● demonstrate the safe use of appropriate and available tools and equipment ● demonstrate the sequence of framing tasks in a logical and efficient manner.
Safety	● identify site-specific safety hazards and precautions.
Design	● demonstrate procedures used in plate layout.
Fastening Systems	● select and apply appropriate mechanical fasteners.
Careers	● follow verbal instructions ● identify common occupations found at a framing project ● describe the role of each participant in the building process.

MODULE RC204: INTERIOR WALL FINISHING

Level: Intermediate

Module Learner Expectations and Assessment Standards

Module Learner Expectations	Assessment Standards
<i>The student will:</i> ● experience tasks related to tasks of basic interior finishing; e.g., insulating, vapour and air barrier installation, gypsum board application procedures.	<i>The student will:</i> ● identify and comply with Building Code sections relating to insulation, vapour/air barriers and gypsum board applications/specifications ● describe and comply with common energy efficient construction techniques ● install insulation and vapor/air barriers ● develop a material/estimate list ● demonstrate interior finishing procedures (e.g., boarding, filling, sanding, spraying) to industry standards ● comply with Building Code and teacher/supervisor tolerances ● produce a surface that is free of surface flaws, uniform and aesthetically pleasing.

Specific Learner Expectations

Concept	Specific Learner Expectations
Materials	<i>The student will:</i> ● identify insulation, vapour and air barrier materials ● name types of gypsum wall board ● select from a list of standard sizes of gypsum wallboard ● identify standard edge shapes of gypsum wallboard ● identify hardware and fasteners used with gypsum wallboard ● identify and/or install ceramic and/or synthetic tiles.
Tools, Equipment and Procedures	● install insulation using approved methods ● install and seal vapour and air barriers ● apply gypsum board and tape a wall ● complete estimate of insulation, vapour barrier and drywall.
Safety	● identify wall finishing hazard ● demonstrate typical safety procedures.

MODULE RC204: INTERIOR WALL FINISHING (continued)

Concept	Specific Learner Expectations
Design	<i>The student will:</i> ● describe industry standards for interior finishing procedures ● describe energy efficient construction ● demonstrate standard energy efficient installation techniques.
Fastening Systems	● use drywall nails, screws and adhesives.
Finishing	● demonstrate taping and spraying of drywall ● describe types of finishes that may be applied to gypsum wallboard.
Careers	● describe the general procedure for bidding on drywall contracts.

MODULE RC205: INTERIOR TRIM FINISHING

Level: Intermediate

Module Learner Expectations and Assessment Standards

Module Learner Expectations	Assessment Standards
<i>The student will:</i> ● complete tasks related to final finishing of interiors; e.g., installing trim, doors, wallpapering, panelling, painting and floor finishes.	<i>The student will:</i> ● identify and comply with floor plans, building sections, related specification sheets and Building Code ● describe and identify different types of interior finishing materials and techniques ● demonstrate proper procedure for door hanging ● demonstrate procedures for wall coverings; e.g., wall paneling, tiling, wall papering, painting ● demonstrate procedures for installing floor covering; e.g., linoleum, carpet, tile, wood ● demonstrate procedures for cutting, fitting and finishing trim; e.g., base board, casing, moldings.

Specific Learner Expectations

Concept	Specific Learner Expectations
Materials	<i>The student will:</i> ● describe and identify types of interior finishing materials ● describe the types and uses of flooring materials ● describe and demonstrate marking and handling methods.
Tools, Equipment and Procedures	● efficiently produce accurate trim joints ● fabricate a door jamb ● recognize the correct hand for doors ● hang door in fabricated jamb ● install door in rough opening of a wall ● install a passage lock set ● install a bifold door ● describe the methods of preparing walls for vertical panelling ● describe and demonstrate procedures for installing interior trim finishes.
Safety	● demonstrate the appropriate safety procedures.

MODULE RC205: INTERIOR TRIM FINISHING (continued)

Concept	Specific Learner Expectations
Design	<i>The student will:</i> ● describe and/or demonstrate aesthetics considerations for the selection and installation of each type of wall covering.
Fastening Systems	● select and properly install appropriate fasteners ● describe preparation for the application of interior trim finishes.
Finishing	● describe and/or demonstrate the selection and use of sealants, fillers and other materials ● identify and apply stains and surface sealants.
Careers	● identify local enterprises involved in interior trim finishes.

MODULE RC206: INTERIOR FINISHING PROJECT

Level: Intermediate

Module Learner Expectations and Assessment Standards

Module Learner Expectations	Assessment Standards
<i>The student will:</i> ● complete tasks related to interior finishing in local residential buildings.	<i>The student will:</i> ● identify and comply with Building Code sections that apply to cabinet installation ● identify and read floor plans and related specification sheets ● identify types of cabinets and installation procedures ● demonstrate hardware installation procedures ● select and apply appropriate finishing techniques ● install a counter top.

Specific Learner Expectations

Concept	Specific Learner Expectations
Materials	<i>The student will:</i> ● identify materials specified on the plans.
Tools, Equipment and Procedures	● describe methods of marking and identifying interior finishing components and cabinets for the construction site ● describe handling and storing procedures ● describe methods of fastening cabinets to walls and floors ● describe the procedure for installing cabinets ● safely demonstrate a variety of interior finishing tasks common to residential construction ● demonstrate all finishing tasks to industry standards.
Safety	● identify and follow appropriate safety procedures for the job site.
Design	● follow verbal, written and/or pictorial directions.
Fastening Systems	● select and use appropriate fastening systems.
Finishing	● select and apply finishes as directed.
Careers	● identify careers common to these tasks.

MODULE CC201: INTRODUCTION TO COMMERCIAL CONSTRUCTION

Level: Intermediate

Module Learner Expectations and Assessment Standards

Module Learner Expectations	Assessment Standards
<i>The student will:</i> ● describe the scope of commercial construction within Alberta ● recognize the differences between residential and commercial construction (i.e., type of project, nature of work site, career focus) ● identify materials, procedures and structural components that are specific to the commercial work site ● identify and demonstrate the safety skills specific to commercial work sites.	<i>The student will:</i> ● list differences between commercial and residential construction; e.g., project type, nature of work site, career focus ● identify the differences between commercial and residential construction; e.g., project type, nature of work site, career focus ● demonstrate safe rigging procedures in simulated situations ● demonstrate consistent use of correct lift signals ● correctly identify the materials and structural components peculiar to and commonly found on the commercial construction site; e.g., preformed blocks, straw mats, extruded polystyrene form work components and systems, structural systems (beams, girders, grade beams).

Specific Learner Expectations

Concept	Specific Learner Expectations
Materials	<i>The student will:</i> ● identify materials common to commercial construction sites; e.g., wood, metal, synthetics, concrete, preformed blocks and bricks, glass.
Tools, Equipment and Procedures	● identify tools and equipment common to a commercial construction site ● erect a scaffold.
Safety	● demonstrate basic lifting signals ● identify rigging safety standards and procedures.

MODULE CC201: INTRODUCTION TO COMMERCIAL CONSTRUCTION (continued)

Concept	Specific Learner Expectations
Design	<i>The student will:</i> ● describe the purpose of and identify columns, beams, girders and grade beams ● define form ply, taper ties, snap ties, walers and strong backs ● describe the need for form strip ability.
Fastening Systems	● identify and describe the purpose of snap ties, double-headed nails, wedges and cam locks.
Finishing	● describe the purpose of form oiling and chamfer strips.
Careers	● draw a “chain of command” chart for a commercial construction site.

MODULE CC202: COMMERCIAL INTERIOR FINISHING

Level: Intermediate

Module Learner Expectations and Assessment Standards

Module Learner Expectations	Assessment Standards
<i>The student will:</i> ● demonstrate interior finishing techniques used in commercial construction project.	<i>The student will:</i> ● apply wall and ceiling finishes commonly used in commercial applications ● perform installations and applications to industry standards ● construct walls and ceilings to industry standards.

Specific Learner Expectations

Concept	Specific Learner Expectations
Materials	<i>The student will:</i> ● identify common finishing materials ● construct wall framing of metal studs ● install wall materials and finishes ● install ceiling materials and finishes ● estimate floor, wall and ceiling coverings.
Tools, Equipment and Procedures	● identify procedures for demountable wall systems ● apply required finishing.
Safety	● demonstrate safe use procedures ● identify hazards associated with finishing operations ● determine WHMIS precautions related to finishing materials.
Design	● identify and consider factors related to finish selection.
Fastening Systems	● identify and demonstrate the use of appropriate fastening systems.
Finishing	● apply spray finishes on walls and/or ceilings.
Careers	● describe and identify careers and opportunities associated with commercial construction finishing.

MODULE CC203: FLOOR FINISHES

Level: Intermediate

Module Learner Expectations and Assessment Standards

Module Learner Expectations	Assessment Standards
<i>The student will:</i> ● identify and apply a variety of floor materials and finishes.	<i>The student will:</i> ● install at least two different floor finish materials; e.g., hardwood, linoleum, tile ● complete applications to industry standards ● identify career opportunities related to flooring.

Specific Learner Expectations

Concept	Specific Learner Expectations
Materials	<i>The student will:</i> ● identify floor finish materials made from woods, synthetics and earths ● identify products commonly used in residential and commercial buildings.
Tools, Equipment and Procedures	● install available flooring materials ● produce accurate and aesthetically pleasing cuts and joints.
Safety	● demonstrate safe use procedures ● identify hazards associated with floor finishes ● determine precautions associated with floor finishes; e.g., WHMIS, OHS.
Design	● identify and consider factors related to finish selection ● identify suitable flooring materials for given situations.
Fastening Systems	● identify and demonstrate the use of appropriate fastening systems.
Finishing	● demonstrate required finishing and cleanup tasks.

MODULE CC203: FLOOR FINISHES (continued)

Concept	Specific Learner Expectations
Careers	<i>The student will:</i> ● identify and describe careers and opportunities related to floor finishes ● identify certification and training opportunities related to floor finishing ● identify related knowledge, skills and attitudes that benefit people involved in floor finishing.

MODULE MO201: MILLWORK PROCEDURES

Level: Intermediate

Module Learner Expectations and Assessment Standards

Module Learner Expectations	Assessment Standards
<i>The student will:</i> ● experience the basic joinery procedures and design considerations related to cabinet making.	<i>The student will:</i> ● create an orthographic drawing that contains dimensions and labels according to Canadian Drafting Standards ● describe the project and joints in proper terminology ● develop a material/estimate/cutting lists ● select appropriate materials and fasteners to be used in cabinetry project ● demonstrate proper cutting/joinery procedures ● demonstrate proper assembly procedures ● demonstrate proper finishing procedures.

Specific Learner Expectations

Concept	Specific Learner Expectations
Materials	<i>The student will:</i> ● identify traditional cabinetry materials ● define glue laminated wood products, their use, and ordering criteria ● identify composite laminated systems.
Tools, Equipment and Procedures	● construct a small millwork projects containing two or more joints; e.g., bench top router table ● produce a project meeting design tolerances ● demonstrate the safe use and maintenance of required tools and equipment ● use laminate cutters, trimmers and rollers.
Safety	● identify and demonstrate safety rules associated with required materials and tasks ● describe the workplace responsibilities of the Occupational Health and Safety Board, the employer and the worker ● define terms used in the Occupational Health and Safety Act ● state the Occupational Health and Safety regulations regarding the reporting of accidents on the job.

MODULE MO201: MILLWORK PROCEDURES (continued)

Concept	Specific Learner Expectations
Design	<i>The student will:</i> ● draw simple isometric and orthographic plans ● identify the purpose of jigs ● select and utilize materials with consideration for appearance (e.g., grain) and economical use of materials ● sketch millwork plans.
Fastening Systems	● identify and describe the purpose of adhesives, mechanical fasteners, specialized clips and fasteners for synthetic wood panels and products; e.g., corrugated fasteners, plastic inserts.
Finishing	● identify specialize finishes for millwork ● apply suitable finishes ● identify and use molded cabinet products.
Careers	● identify local examples of careers and opportunities in millwork.

MODULE MO202: MILLWORK ASSEMBLY AND FINISHING

Level: Intermediate

Module Learner Expectations and Assessment Standards

Module Learner Expectations	Assessment Standards
<i>The student will:</i> ● complete tasks associated with final stages of cabinet assembly, finishing and installation.	<i>The student will:</i> ● demonstrate installation procedures ● demonstrate proper cabinet assembly procedures ● demonstrate proper drawer assembly procedures/installation ● demonstrate proper door/drawer face installation ● demonstrate door/drawer construction techniques and faces.

Specific Learner Expectations

Concept	Specific Learner Expectations
Materials	<i>The student will:</i> ● apply fillers and trim ● select and install moldings ● identify specialty and innovative cabinetry materials ● identify finger-jointed products.
Tools, Equipment and Procedures	● install doors, trim and cabinets ● apply trim.
Safety	● demonstrate relevant safety procedures.
Design	● demonstrate “storypole” layout ● identify locations suited to supporting wall cabinets.
Fastening Systems	● select suitable fasteners for final installation of millwork ● list and describe the categories of adhesives and cements and how they should be used. ● identify and select mastics.
Finishing	● apply final trim and finishes.
Careers	● identify opportunities in further training in millwork.

MODULE MO203: MILLWORK PROJECT

Level: Intermediate

Module Learner Expectations and Assessment Standards

Module Learner Expectations	Assessment Standards
<i>The student will:</i> ● plan and construct a millwork project that applies the concepts from the previous millwork modules.	<i>The student will:</i> ● create an orthographic drawing that contains dimensions and labels according to Canadian Drafting Standards and labeled in proper terminology ● write material/estimate/cutting list ● select appropriate material and fasteners ● produce the project to industry standards.

Specific Learner Expectations

Concept	Specific Learner Expectations
Materials	<i>The student will:</i> ● select suitable materials for his or her project.
Tools, Equipment and Procedures	● demonstrate efficient and effective planning, layout, cutting and assembling techniques.
Safety	● demonstrate relevant safety procedures.
Design	● draw a set of plans for the project ● lay out materials to meet aesthetic requirements.
Fastening Systems	● select and install mechanical and adhesive fasteners.
Finishing	● apply suitable finishes.
Careers	● identify enterprises that construct similar projects.

MODULE MO204: FURNITURE MILLWORK

Level: Intermediate

Module Learner Expectations and Assessment Standards

Module Learner Expectations	Assessment Standards
<i>The student will:</i> ● apply theory and practices associated with furniture making.	<i>The student will:</i> ● create an orthographic drawing that contains dimensions and labels according to Canadian Drafting Standards ● develop a material/estimate/cutting lists ● design and set up required jigs ● complete five required joinery procedures ● produce a project to industry standards.

Specific Learner Expectations

Concept	Specific Learner Expectations
Materials	<i>The student will:</i> ● identify furniture-making materials and their characteristics.
Tools, Equipment and Procedures	● set up furniture-making jigs ● produce five or more of the following joints: – spline – mitre – dowel – rabbet – lap – dado – mortise and tenon – dovetail – scarf – board edge joints; e.g., glue joints, biscuit joints, tongue and groove joints.
Safety	● demonstrate safety devices and procedures associated with required power tools.
Design	● describe factors associated with furniture design.

MODULE MO204: FURNITURE MILLWORK (continued)

Concept	Specific Learner Expectations
Fastening Systems	<i>The student will:</i> ● use mechanical and adhesive fastening systems.
Finishing	● apply oil, veneer and laminate finishes.
Careers	● identify career opportunities in furniture millwork.

MODULE MO205: FURNITURE PROJECT

Level: Intermediate

Module Learner Expectations and Assessment Standards

Module Learner Expectations	Assessment Standards
<i>The student will:</i> ● plan and construct a furniture project that applies the concepts of the previous furniture modules.	<i>The student will:</i> ● modify or create plans for the project using orthographic or pictorial representation ● select appropriate materials ● construct the finished project to conform to industry standards.

Specific Learner Expectations

Concept	Specific Learner Expectations
Materials	<i>The student will:</i> ● select suitable materials for the project.
Tools, Equipment and Procedures	● demonstrate effective and efficient planning, layout, cutting and assembly techniques.
Safety	● demonstrate relevant safety procedures.
Design	● draw a set of plans for the project ● lay out materials to meet aesthetic requirements.
Fastening Systems	● select and install mechanical and adhesive fasteners.
Finishing	● apply suitable finishes.
Careers	● identify enterprises that construct similar projects.

MODULE MO206: WOOD-TURNING OPERATIONS

Level: Intermediate

Module Learner Expectations and Assessment Standards

Module Learner Expectations	Assessment Standards
<i>The student will:</i> ● perform wood-turning operations to create original products and pre-designed components ● demonstrate the use of templates/patterns and reading drawings to produce a product.	<i>The student will:</i> ● demonstrate safe turning procedures ● produce one original project and one pre-designed component on the wood lathe ● produce projects to within a tolerance of 1 mm ● produce and use a template and/or pattern produced through the interpretation of a working drawing.

Specific Learner Expectations

Concept	Specific Learner Expectations
Materials	<i>The student will:</i> ● identify and select appropriate materials for a specific project.
Tools, Equipment and Procedures	● demonstrate safe and accepted mounting and shaping operations.
Safety	● wear appropriate safety clothing ● identify safety hazards associated with wood-turning operations.
Design	● make and use templates/patterns ● use a variety of woods to create an aesthetically pleasant design and shape.
Fastening Systems	● select and use appropriate fasteners.
Finishing	● apply suitable finishes in relation to purpose and appearance of the product.
Careers	● identify career opportunities in wood turning.

MODULE MP201: MANUFACTURING SYSTEMS DESIGN

Level: Intermediate

Module Learner Expectations and Assessment Standards

Module Learner Expectations	Assessment Standards
<i>The student will:</i> ● address current theories of operation and planning for manufacturing ● identify examples of practical application of these theories.	<i>The student will:</i> ● identify, discuss and evaluate current theories of operations and planning ● identify at least three examples of different manufacturing operations and planning theories ● define common manufacturing terms; e.g., JIT, TQM, CAM ● define current issues in manufacturing.

Specific Learner Expectations

Concept	Specific Learner Expectations
Materials	<i>The student will:</i> ● identify materials used in common manufactured products.
Tools, Equipment and Procedures	● identify tools and equipment used to manufacture common items.
Safety	● describe safety issues in manufacturing.
Design	● define and describe examples of CAM, TQM, JIT, and design for production ● draw flow charts of manufacturing processes.
Fastening Systems	● identify fasteners used in manufactured items.
Finishing	● identify processes and materials used in common items.
Careers	● identify occupations in manufacturing ● identify the “chain of command” in a typical manufacturing operation ● describe types of businesses ● describe labour unions and labour organizations ● describe small business ownership.

MODULE AC201: CONSTRUCTION TECHNOLOGIES INNOVATIONS

Level: Intermediate

Module Learner Expectations and Assessment Standards

Module Learner Expectations	Assessment Standards
<i>The student will:</i> ● select a materials or procedures innovation for study within the area of Construction Technologies ● working independently, produce a research report ● working independently, prepare a display and/or presentation related to the research report.	<i>The student will:</i> ● create a proposal containing a description of the innovation, sources of information to be used, rationale for the study, methodology, description of final report plus presentation and or display ● create a report conforming to the format/style approved by teacher ● complete all aspects of the proposal ● produce a presentation and/or a display of the innovation as described in the proposal.

Specific Learner Expectations

Concept	Specific Learner Expectations
Materials	<i>The student will:</i> ● identify attributes, advantages and disadvantages provided by the innovation.
Tools, Equipment and Procedures	● identify attributes, advantages and disadvantages provided by the innovation.
Safety	● identify safety issues related to the innovation ● explore the impact on personal and environmental safety.
Design	● describe past materials or procedures the innovation replaces ● identify design aspects related to the innovation.
Fastening Systems	● describe the innovation's impact or relationship to fastening systems.
Finishing	● describe the innovation's impact or relationship to finishing systems.
Careers	● describe the impact this innovation will have on existing occupations and future training for Construction Technologies.

MODULE RR301: HISTORICAL RESTORATION

Level: Advanced

Module Learner Expectations and Assessment Standards

Module Learner Expectations	Assessment Standards
<i>The student will:</i> ● identify materials and techniques used to produce the project originally ● select and apply traditional and/or current methods and suitable materials for restoration tasks.	<i>The student will:</i> ● list the original materials and construction technique ● identify hazards associated with tasks ● demonstrate required traditional procedures to teacher standards ● identify and conform to Building Code requirements.

Specific Learner Expectations

Concept	Specific Learner Expectations
Materials	<i>The student will:</i> ● identify traditional materials used ● identify attributes of traditional materials and any replacement materials ● identify materials that can be recycled.
Tools, Equipment and Procedures	● safely demonstrate the use of traditional technology and/or current technology.
Safety	● identify personal and environmental hazards and follow safety procedures associated with historical restoration ● investigate and comply with relevant legislation.
Design	● identify the feasibility of the project ● identify aspects of traditional designs ● identify and use information sources for researching historical restoration ● produce sketches and/or plans for historical restoration projects.
Fastening Systems	● identify and/or produce replacement fasteners.

MODULE RR301: HISTORICAL RESTORATION (continued)

Concept	Specific Learner Expectations
Finishing	<i>The student will:</i> ● identify and investigate existing finishes ● determine the appropriate restoration procedure ● apply materials to match traditional finishes.
Careers	● identify opportunities for entrepreneurial ventures and further training associated with restoration.

MODULE RR302: FURNITURE RESTORATION

Level: Advanced

Module Learner Expectations and Assessment Standards

Module Learner Expectations	Assessment Standards
<i>The student will:</i> ● plan and demonstrate the entire process of restoring hard and/or soft surfaces of furniture.	<i>The student will:</i> ● prepare a project plan of procedure outlining materials originally used, replacement materials required, tools and equipment required and safety hazards specific to the project ● completely restore hard/soft furniture surfaces according to plans ● restore furniture to a usable, authentic and pleasing condition.

Specific Learner Expectations

Concept	Specific Learner Expectations
Materials	<i>The student will:</i> ● identify the original materials used ● identify attributes of original materials and replacement materials ● identify materials that can be recycled.
Tools, Equipment and Procedures	● identify and/or safely demonstrate the use of original technology ● identify and safely demonstrate the use of current technology.
Safety	● identify and set up proper ventilation ● identify hazardous materials; e.g., lead ● investigate and comply with relevant legislation ● use appropriate protective clothing ● identify and demonstrate proper storage techniques for refinishing materials.
Design	● identify original design aspects and features ● identify the feasibility of the project ● select appropriate materials and techniques.
Fastening Systems	● identify and/or produce replacement fasteners.

MODULE RR302: FURNITURE RESTORATION (continued)

Concept	Specific Learner Expectations
Finishing	<i>The student will:</i> ● complete finishing tasks as required.
Careers	● identify opportunities for entrepreneurial ventures and further training associated with furniture restoration.

MODULE RR303: BUILDING RENOVATION PRACTICES

Level: Advanced

Module Learner Expectations and Assessment Standards

Module Learner Expectations	Assessment Standards
<i>The student will:</i> ● analyze the existing structure and attributes ● analyze the renovation requirements ● evaluate and discuss the project feasibility ● identify and undertake steps in the renovation process.	<i>The student will:</i> ● identify Building Code sections that relate to the restoration project ● evaluate and offer realistic recommendations for the project feasibility; e.g., cost, viability, procedures, materials ● develop a schedule for the renovation process ● perform renovation tasks to industry standards.

Specific Learner Expectations

Concept	Specific Learner Expectations
Materials	<i>The student will:</i> ● identify existing materials ● identify replacement materials as per supplied plans and specifications.
Tools, Equipment and Procedures	● install insulation vapour barrier and interior finishes as required ● retrofit according to plans and constraints.
Safety	● demonstrated relevant safety procedures ● identify operations that must be conducted by a qualified tradesperson ● identify structural considerations and environmental concerns ● identify hazards related to the project ● investigate and comply with relevant legislation.

MODULE RR303: BUILDING RENOVATION PRACTICES (continued)

Concept	Specific Learner Expectations
Design	<i>The student will:</i> ● identify Building Code requirements ● consider ethical and architectural esthetics of renovation projects ● describe heat transfer ● identify water vapour and condensation in buildings and describe control methods ● analyze the requirements of air tightness ● describe ways to retrofit ● describe sound transmission control systems.
Fastening Systems	● select and use appropriate fasteners.
Finishing	● select and apply finishes as per plans.
Careers	● identify opportunities for entrepreneurial ventures and further training associated with renovation.

MODULE RR304: BUILDING RENOVATION PROJECT

Level: Advanced

Module Learner Expectations and Assessment Standards

Module Learner Expectations	Assessment Standards
<i>The student will:</i> ● engage in a preplanned, structured experience in building renovation at a work site.	<i>The student will:</i> ● perform renovation tasks to industry standards ● select appropriate tools, equipment, procedures and materials ● conform plans related standards and Building Codes.

Specific Learner Expectations

Concept	Specific Learner Expectations
Materials	<i>The student will:</i> ● identify and use materials specified on given plans.
Tools, Equipment and Procedures	● identify procedures and select appropriate tools and equipment.
Safety	● identify and follow related standards and legislation ● demonstrate required safety procedures.
Design	● estimate material quantities ● read and follow given plans, specifications and supervisor's instructions.
Fastening Systems	● select and use appropriate fasteners.
Finishing	● select and apply finishes as per plans.
Careers	● identify opportunities for entrepreneurial ventures and further training associated with renovation.

MODULE RC301: SITE PREPARATION

Level: Advanced

Module Learner Expectations and Assessment Standards

Module Learner Expectations	Assessment Standards
<i>The student will:</i> ● demonstrate the application of theory and practices associated with building site layout, excavation and shoring.	<i>The student will:</i> ● describe and use batter boards and plumb bobs to transfer building lines accurately ● use a builder's level to describe differences in elevation and transfer elevations (Note: All elevations shall have a tolerance of 4 mm with a maximum tolerance of 6 mm) ● lay out lot lines and building lines using Pythagoras' Theorem and an engineer's transit with a tolerance of 2 mm over 6 metres ● define and describe the purpose of excavation and indicate the purpose of shoring ● list the hazards and safety procedures specific to site preparation.

Specific Learner Expectations

Concept	Specific Learner Expectations
Materials	<i>The student will:</i> ● identify and select site layout materials.
Tools, Equipment and Procedures	● describe common building site preparation tools and equipment ● describe preliminary layout procedures by measuring only ● describe preliminary layout procedures by measuring and using a survey instrument ● locate property pins and layout buildings ● complete a layout of a scaled lot and building ● set up and use a builder's laser level.
Safety	● identify conditions that require shoring ● identify safety requirements for excavations and shoring ● describe excavation shoring practices ● identify safety practices used around excavation equipment ● identify underground and overhead site-specific hazards.

MODULE RC301: SITE PREPARATION (continued)

Concept	Specific Learner Expectations
Design	<i>The student will:</i> ● read site and foundation plans ● complete excavation estimate ● transfer elevations ● site and record backsights and foresights for establishing elevations ● describe how batter boards are set up and used.
Fastening Systems	● select and use appropriate fasteners.
Finishing	● determine and ensure that site is ready for further building operations.
Careers	● identify careers and training related to site preparation.

MODULE RC302: RESIDENTIAL CONCRETE FOUNDATIONS

Level: Advanced

Module Learner Expectations and Assessment Standards

Module Learner Expectations	Assessment Standards
<i>The student will:</i> ● engage in forming and placing concrete foundations.	<i>The student will:</i> ● estimate and order concrete for residential foundations ● assist in the preparation, erection and bracing of foundation form work (Note: Form work will be to plumb to a tolerance of 2 mm in 2.4 metres and square to a tolerance of 4 mm) ● describe requirements of proper concrete placement; e.g., amount of drop, temperature, consolidation ● place and consolidate concrete that is free of voids and defects.

Specific Learner Expectations

Concept	Specific Learner Expectations
Materials	<i>The student will:</i> ● recognize concrete foundation and reinforcing materials ● recognize common forming materials.
Tools, Equipment and Procedures	● identify and demonstrate: – types of foundations – footing and foundation forming – placing concrete foundations.
Safety	● identify and demonstrate relevant safety procedures.
Design	● estimate material quantities ● prepare concrete order ● identify relevant Building Code regulations ● describe damp roofing and drainage ● describe the scope of footings as required in residential buildings ● analyze building loads ● describe how building loads are transferred to the soil ● define soil and its load-carrying capacity ● describe bulking ● describe how soil exploration is conducted

MODULE RC302: RESIDENTIAL CONCRETE FOUNDATIONS (continued)

Concept	Specific Learner Expectations
Design (continued)	<i>The student will:</i> ● describe how frost affects foundations ● describe how water affects foundations.
Fastening Systems	● select and use appropriate fasteners.
Finishing	● complete required finishing and curing operations.
Careers	● identify opportunities for entrepreneurial ventures and further training associated with concrete foundations.

MODULE RC303: PRESERVED WOOD FOUNDATIONS

Level: **Advanced**

Module Learner Expectations and Assessment Standards

Module Learner Expectations	Assessment Standards
<i>The student will:</i> ● demonstrate tasks related to construction of preserved wood foundations.	<i>The student will:</i> ● construct P.W.F. framing that is plumb to 2 mm over a span of 2.4 metres and square to a tolerance of 4 mm ● apply a vapour barrier to P.W.F. with a quality control factor of 100 per cent ● explain the special concerns involving back filling a P.W.F. ● describe the hazards and safety precautions required when handling wood preservatives ● recognize and conform to certification requirements and Building Codes.

Specific Learner Expectations

Concept	Specific Learner Expectations
Materials	<i>The student will:</i> ● identify materials used in preserved wood foundations.
Tools, Equipment and Procedures	● construct and erect foundation framing ● identify and/or demonstrate leveling operations as required ● identify and/or demonstrate framing and erection techniques.
Safety	● identify site-specific safety hazards and procedures.
Design	● identify certification stamp on plans ● adhere to plans and specifications ● demonstrate layout techniques.
Fastening Systems	● select and use appropriate fasteners.
Finishing	● apply surface and joint sealers.
Careers	● identify opportunities for entrepreneurial ventures and further training associated with preserved wood foundations.

MODULE RC304: ROOF FRAMING

Level: Advanced

Module Learner Expectations and Assessment Standards

Module Learner Expectations	Assessment Standards
<i>The student will:</i> ● identify terms and types of designs related to roof framing ● demonstrate tasks related to layout and construction of roof framing.	<i>The student will:</i> ● label truss systems and rafter systems ● consistently use correct roof framing terminology ● calculate rafter line length using the framing square, rafter tables and mathematical methods to an accuracy of 2 mm on an average rafter ● construct roof framing and sheathing to industry standards.

Specific Learner Expectations

Concept	Specific Learner Expectations
Materials	<i>The student will:</i> ● estimate roof framing and sheathing material quantities ● identify manufactured truss systems.
Tools, Equipment and Procedures	● demonstrate framing and sheathing tasks associated with residential truss systems ● demonstrate the safe use of appropriate and available tools and equipment ● demonstrate the sequence of roof framing tasks in a logical and efficient manner.
Safety	● identify site-specific safety hazards and precautions.
Design	● identify relevant Building Code regulations ● identify and describe several roof styles ● describe distinguishing features of each style of roof ● define roofing terms ● describe gable end trusses ● describe cornice construction ● describe gable projection ● describe roof sheathing

MODULE RC304: ROOF FRAMING (continued)

Concept	Specific Learner Expectations
Design (continued)	<i>The student will:</i> ● define truss terms ● describe how trusses are manufactured ● describe how trusses are erected.
Fastening Systems	● select and use appropriate fastening devices.
Finishing	● install fascia board.
Careers	● identify opportunities for entrepreneurial ventures, employment, and further training associated with roof framing.

MODULE RC305: ADVANCED FRAMING PROJECT

Level: Advanced

Module Learner Expectations and Assessment Standards

Module Learner Expectations	Assessment Standards
<i>The student will:</i> ● undertake a project incorporating common aspects of residential framing.	<i>The student will:</i> ● construct a framing project to industry standards and plans ● construct framing that conforms to Building Code requirements and a general tolerance of 5 mm.

Specific Learner Expectations

Concept	Specific Learner Expectations
Materials	<i>The student will:</i> ● identify specified materials.
Tools, Equipment and Procedures	● demonstrate the safe use of available equipment and tools ● demonstrate framing tasks.
Safety	● identify site-specific safety hazards and precautions.
Design	● identify and conform to Building Code requirements ● demonstrate procedures used in plate layout.
Fastening Systems	● select and apply appropriate fasteners.
Finishing	● ensure framing is square, plumb, level and accurate ● ensure all components are in place.
Careers	● identify career opportunities in residential framing.

MODULE RC306: STAIR DESIGN AND CONSTRUCTION

Level: Advanced

Module Learner Expectations and Assessment Standards

Module Learner Expectations	Assessment Standards
<i>The student will:</i> ● complete a stair project ● apply theories and standards to stair construction projects.	<i>The student will:</i> ● sketch and label stair plans ● accurately calculate head room, rise, maximum run given hypothetical or actual stair design situations ● design and select materials for, and construct, a straight flight of stairs (Note: The finished flight of stairs must conform to Building Code plans and treads and risers must be uniform with a maximum variance of 1 mm in any one step).

Specific Learner Expectations

Concept	Specific Learner Expectations
Materials	<i>The student will:</i> ● identify common stair materials in residential construction projects ● describe the process for estimating material quantities for wood stairs.
Tools, Equipment and Procedures	● select appropriate tools, equipment and procedures ● lay out and construct a set of stairs ● describe methods of installing stringers, risers and treads.
Safety	● demonstrate all relevant safety practices.
Design	● work within tolerance of the design ● calculate material quantities for a set of wood stairs ● describe the parts of a stair ● identify types of stair ● identify terms and regulations related to stair design (Alberta Building Code).
Fastening Systems	● select and apply appropriate fasteners.

MODULE RC306: STAIR DESIGN AND CONSTRUCTION (continued)

Concept	Specific Learner Expectations
Finishing	<i>The student will:</i> ● produce a project to a marketable standard ● produce a project to design tolerances.
Careers	● identify entrepreneurial opportunities, careers and training related to stairs.

MODULE RC307: SIDING FINISHES

Level: Advanced

Module Learner Expectations and Assessment Standards

Module Learner Expectations	Assessment Standards
<i>The student will:</i> ● identify and install common siding and cornice finishes to industry standards.	<i>The student will:</i> ● prepare a material and labour estimate ● identify and describe common siding and cornice materials ● install siding and cornice finishes to plans, Building Code and industry standards ● install, square, plumb and level siding and cornice materials.

Specific Learner Expectations

Concept	Specific Learner Expectations
Materials	<i>The student will:</i> ● identify common siding and cornice materials: – metal – plastic/vinyl – wood.
Tools, Equipment and Procedures	● select and safely use appropriate equipment, tools and procedures ● install common siding and cornice materials.
Safety	● identify and follow site-specific hazards and precautions.
Design	● read elevation drawings to determine siding and cornice types and material estimates ● describe the calculation process for exterior finish ● calculate material estimate for exterior finish ● identify and adhere to Building Code regulations.
Fastening Systems	● select and use appropriate procedures.
Finishing	● install siding and cornice materials to meet industry standards.
Careers	● identify entrepreneurial opportunities, employment and training related to siding.

MODULE RC308: MASONRY FINISHES

Level: Advanced

Module Learner Expectations and Assessment Standards

Module Learner Expectations	Assessment Standards
<i>The student will:</i> ● identify and install masonry wall finishes.	<i>The student will:</i> ● describe and prepare common mortar/cement mixtures ● develop a material and labour estimate sheet ● demonstrate stucco/parging procedures installation of masonry finishes to industry standard and Building Code.

Specific Learner Expectations

Concept	Specific Learner Expectations
Materials	<i>The student will:</i> ● recognize masonry materials used in exterior finishes ● prepare mortar and cement mixtures.
Tools, Equipment and Procedures	● install stucco and brick finishes ● apply parging ● cut bricks to dimensions.
Safety	● identify and conform to all relevant safety procedures related to masonry work ● read drawings for materials, dimensions and instructions.
Design	● complete a materials estimate from a set of plans ● identify and conform to Building Code requirements
Fastening Systems	● identify appropriate fasteners used in industry ● apply cement adhesive (mortar) as directed ● install mechanical fasteners as required ● install reinforcing mesh as required.
Finishing	● produce acceptable masonry joints.
Careers	● identify careers that require masonry skills.

MODULE RC309: INSTALLING PREFABRICATED UNITS AND TRIM

Level: Advanced

Module Learner Expectations and Assessment Standards

Module Learner Expectations	Assessment Standards
<i>The student will:</i> ● install window and door units and apply exterior trim.	<i>The student will:</i> ● install prefabricated units to industry standard and Building Code requirements ● identify and describe materials using blueprints ● demonstrate procedures to square, plumb and/or level units as required.

Specific Learner Expectations

Concept	Specific Learner Expectations
Materials	<i>The student will:</i> ● identify and describe materials used in the construction of prefabricated units; e.g., doors and windows.
Tools, Equipment and Procedures	● identify the procedure to install a prefabricated unit ● install prefabricated door or window units ● install trim as required ● identify tasks related to assembly of prefabricated units.
Safety	● identify and conform to safety procedures related to tasks.
Design	● identify and describe standards related to prefabricated units.
Fastening Systems	● identify and properly install required fasteners.
Finishing	● identify and apply the appropriate finish indicated on plans.
Careers	● identify occupations that install prefabricated units.

MODULE RC310: ROOF FINISHING

Level: Advanced

Module Learner Expectations and Assessment Standards

Module Learner Expectations	Assessment Standards
<i>The student will:</i> ● install roofing materials used on residential homes.	<i>The student will:</i> ● identify and describe common roof finishes and practices ● complete a roofing estimate ● install two or more types of roof finishes ● complete layout and installation to conform to industry standards, plans and Building Code.

Specific Learner Expectations

Concept	Specific Learner Expectations
Materials	<i>The student will:</i> ● identify: – asphalt shingles – cedar shakes and shingles – metal panels and shingles – ceramic roof tiles ● describe cedar shingles ● describe cedar shakes ● describe asphalt shingles ● describe built-up roofing ● describe roll roofing ● describe tile and slate roofing ● describe sheet metal roofing ● describe roof flashing.
Tools, Equipment and Procedures	● install a variety of roofing materials; e.g.: – asphalt shingles – cedar shakes and shingles – metal panels and shingles – ceramic roof tiles.
Safety	● demonstrate all relevant safety practices of the roofing industry.

MODULE RC310: ROOF FINISHING (continued)

Concept	Specific Learner Expectations
Design	<i>The student will:</i> ● identify considerations for roof finish selection ● identify roofing material and installation aspects of the Building Code.
Fastening Systems	● identify required fasteners ● install the finish with appropriate numbers, positioning and installation of fasteners.
Finishing	● produce a project to a marketable standard ● produce a project to design tolerances.
Careers	● identify entrepreneurial opportunities, careers and training related to stairs.

MODULE RC311: EXTERIOR FINISHING PROJECT

Level: Advanced

Module Learner Expectations and Assessment Standards

Module Learner Expectations	Assessment Standards
<i>The student will:</i> ● complete tasks related to exterior finishing operations at a work site.	<i>The student will:</i> ● read blueprints and related specification sheets to identify and describe common exterior trim materials ● complete lay out and installation of common exterior finishes to industry, Building Code and plans ● produce an estimate of material and costs.

Specific Learner Expectations

Concept	Specific Learner Expectations
Materials	<i>The student will:</i> ● identify and describe common exterior finishing materials used at the work site.
Tools, Equipment and Procedures	● identify, describe and demonstrate procedures used for exterior finishing at the work site.
Safety	● identify and conform to safety procedures related to the work site.
Design	● identify standards related to residential finishing ● describe a high quality of workmanship related to residential finishing tasks.
Fastening Systems	● demonstrate the proper use of fasteners common to exterior finishing.
Finishing	● apply appropriate finishes.
Careers	● identify the training opportunities available to prepare for a career in finishing.

MODULE RC312: ENERGY EFFICIENT HOUSING DESIGN

Level: Advanced

Module Learner Expectations and Assessment Standards

Module Learner Expectations	Assessment Standards
<i>The student will:</i> ● identify, describe and demonstrate tasks related to theories and practices for energy efficient housing construction.	<i>The student will:</i> ● identify and describe current energy efficient construction practices and materials ● demonstrate current practices of energy efficient construction in a model, display, shop work or work-site project.

Specific Learner Expectations

Concept	Specific Learner Expectations
Materials	<i>The student will:</i> ● identify and describe materials designed for energy efficiency.
Tools, Equipment and Procedures	● identify and describe procedures related to energy efficiency ● identify, describe and demonstrate the installation of insulation, barriers and caulking (Note: Demonstration may be a model, display, shop work or tasks on a work site).
Safety	● identify hazards to workers applying energy efficient materials.
Design	● describe the effect that energy efficiency has on the environment ● identify and conform to energy efficient building standards.
Fastening Systems	● identify and use appropriate fasteners.
Finishing	● identify finishes that contribute to energy efficiency.
Careers	● identify and describe occupations related to energy efficiency in buildings.

MODULE CC301: COMMERCIAL EXTERIOR FINISHES

Level: Advanced

Module Learner Expectations and Assessment Standards

Module Learner Expectations	Assessment Standards
<i>The student will:</i> ● identify and install common commercial wall finishes.	<i>The student will:</i> ● list and describe a variety of exterior treatments commonly used in commercial buildings; e.g., curtain wall treatments, exposed aggregate, exposed design and motifs, brick veneer, natural/synthetic/metal sidings) ● install two or more typical commercial exterior finishes in a simulated or actual situation ● apply and treat to industry standards, Building Code and plan requirements.

Specific Learner Expectations

Concept	Specific Learner Expectations
Materials	<i>The student will:</i> ● identify and describe materials used for commercial wall finishes ● describe attributes of materials identified.
Tools, Equipment and Procedures	● identify and describe safe installation procedures ● demonstrate installation of commercial exterior finishes.
Safety	● identify personal and environmental hazards related to commercial exterior finishes.
Design	● read plans to determine materials and procedures ● identify and conform to related legislation ● identify and apply factors for material selection and application.
Fastening Systems	● select and use appropriate fasteners.
Finishing	● apply an appropriate finish.
Careers	● identify opportunities and preparation for commercial exterior finishing.

MODULE CC302: CONCRETE WORK

Level: Advanced

Module Learner Expectations and Assessment Standards

Module Learner Expectations	Assessment Standards
<i>The student will:</i> ● describe the types and uses of concrete ● prepare forms, place, cure and finish concrete.	<i>The student will:</i> ● demonstrate how Portland cement type, aggregate type and water cement ratio affect the type and the ultimate use of a concrete batch ● accurately make recommendations for a suitable Portland cement type and possible additives for a particular application ● prepare and assemble a typical grade beam form (Note: The form shall be plumb to a tolerance of 2 mm over 2.4 metres and the grade beam shall be accurately located along a predetermined building line) ● place, cure and finish concrete in an actual or simulated work site situation (Note: The concrete shall be free of voids and cured in a manner that will achieve design strength) ● finish all concrete surfaces in a manner appropriate to the function of the project.

★ indicates major element for assessment.

Specific Learner Expectations

Concept	Specific Learner Expectations
Materials	<i>The student will:</i> ● identify the ingredients in concrete ● describe the placing and curing of concrete ● describe the types of concrete and their uses ● identify suitable fasteners.
Tools, Equipment and Procedures	● erect forms to design tolerances ● install reinforcing materials to industry standards ● mix concrete ● apply acceptable smooth and textured finishes ● demonstrate shoring and reshoring.
Safety	● demonstrate all relevant safety procedures ● identify and minimize hazards associated with materials and procedures.

MODULE CC302: CONCRETE WORK (continued)

Concept	Specific Learner Expectations
Design	<i>The student will:</i> ● read plans for required information ● calculate areas and volumes using formulas ● calculate volumes using ratios ● identify and apply standards relevant to concrete.
Fastening Systems	● install recommended fasteners as directed ● select anchor bolts and shields ● select expansive bolts and toggle bolts ● install concrete anchors ● differentiate between high and low velocity tools and recognize typical application uses ● identify explosive actuated tool fasteners, their uses and parts ● identify power loads, power load strengths, and power load safety requirements ● recognize base material suitability and related fastening requirements ● recognize CSA design requirements for explosive actuated tools.
Finishing	● apply smooth and textured finishes ● apply additives and surface treatments.
Careers	● identify opportunities in concrete work.

MODULE CC303: ELEMENTS OF COMMERCIAL CONSTRUCTION

Level: Advanced

Module Learner Expectations and Assessment Standards

Module Learner Expectations	Assessment Standards
<i>The student will:</i> ● identify and demonstrate concepts associated with structural members and roofing systems.	<i>The student will:</i> ● identify and interpret Building Code sections related to precast members and built-up roofing systems ● identify and describe common precast/poured in place members and types of roofing systems ● accurately erect easy-strip and snap-tie forms ● describe general procedures associated with precast/poured in place members and roofing systems.

★ indicates major element for assessment.

Specific Learner Expectations

Concept	Specific Learner Expectations
Materials	<i>The student will:</i> ● identify materials associated with structural members; e.g., curtain walls, beams, girders ● identify materials associated with built-up roofs; e.g., tar and gravel.
Tools, Equipment and Procedures	● describe the transportation of concrete and its placement ● identify the tools used and equipment used for surface treatment of concrete.
Safety	● identify hazards associated with this area ● demonstrate relevant safety procedures.
Design	● identify and describe attributes of three structural (floor, column and beam) systems; e.g., flat plate, flat slab, waffle slab ● describe the scope of footings as used in commercial buildings ● identify the requirements of form design ● identify shoring principles ● identify bracing principles ● identify component spacing principles ● identify and describe the process of installing roof systems.

MODULE CC303: ELEMENTS OF COMMERCIAL CONSTRUCTION (continued)

Concept	Specific Learner Expectations
Fastening Systems	<i>The student will:</i> ● describe the procedures for erecting easy-strip forms ● describe the procedures for erecting snap-tie wall forms ● erect easy-strip forms ● describe the process called “hydration”.
Finishing	● identify surface treatments ● describe how to create various surface treatments ● describe the process called “hydration”.
Careers	● identify and describe occupations at a commercial construction project.

MODULE CC304: SITE MANAGEMENT

Level: Advanced

Module Learner Expectations and Assessment Standards

Module Learner Expectations	Assessment Standards
<i>The student will:</i> ● participate in work-site observation activities ● explore and describe specialized management theories and methods related to the commercial construction site ● record the responsibilities of tradespersons and supervisors of a work site.	<i>The student will:</i> ● accurately describe current management theories and methods that are common to commercial construction ● describe the occupations and responsibilities commonly found on the work site ● identify information resources and legislation that relate to commercial construction ● describe employee/employer expectations common on the work site

★ indicates major element for assessment.

Specific Learner Expectations

Concept	Specific Learner Expectations
Materials	<i>The student will:</i> ● identify and describe available management resources ● identify alternative management resources available at other sites.
Tools, Equipment and Procedures	● list the steps and methods needed to organize a construction project ● describe employer responsibilities and expectations ● perform simulation tasks related to site management.
Safety	● identify and conform to safety legislation ● identify penalties and procedures related to safety infractions.
Design	● identify relevant specifications, legislation and where they are available ● describe the interaction between various trade and skill areas.

MODULE CC304: SITE MANAGEMENT (continued)

Concept	Specific Learner Expectations
Fastening Systems	<i>The student will:</i> ● identify sources of supply for fasteners ● identify standards related to fasteners.
Finishing	● identify the bidding processes for applying finishes at a commercial site.
Careers	● describe employee expectations ● describe effective workplace behaviour ● describe the preparation that the work-site supervisors have for their occupation ● describe a chain of command at a work site ● describe the role of labour organizations in the work site/industry.

MODULE CC305: BUILDING MAINTENANCE

Level: Advanced

Module Learner Expectations and Assessment Standards

Module Learner Expectations	Assessment Standards
<i>The student will:</i> ● identify and demonstrate tasks related to maintenance; e.g., light mechanical, patching, repairing and redecorating.	<i>The student will:</i> ● identify common building system maintenance tasks and certification required to do them ● identify and diagnosis common problems ● repair wall damage on finished gypsum panels ● adjust thermostats, change belts, clean/replace filters, drain traps and perform other common electrical system tasks ● set up a maintenance schedule for a building section.

★ indicates major element for assessment.

Specific Learner Expectations

Concept	Specific Learner Expectations
Materials	<i>The student will:</i> ● identify materials required for maintenance tasks.
Tools, Equipment and Procedures	● identify and use appropriate equipment and tools ● perform basic maintenance tasks.
Safety	● identify tasks that must be delegated to tradesperson ● identify hazards and demonstrate relevant safety precautions related to tasks ● comply with building and safety codes.
Design	● identify and use maintenance schedules ● identify and diagnose problems ● identify any existing design faults.
Fastening Systems	● identify and use appropriate fasteners.
Finishing	● complete task to meet or exceed existing standards and appearances.
Careers	● investigate further education and training related to building maintenance.

MODULE MO301: ADVANCED CABINETRY

Level: Advanced

Module Learner Expectations and Assessment Standards

Module Learner Expectations	Assessment Standards
<i>The student will:</i> ● engage in tasks related to custom-built cabinets. Note: Cabinets shall be enclosures fastened to the structure.	<i>The student will:</i> ● use a story pole for layout in the construction and installation of a custom-built cabinets ● produce a finished cabinet that includes face plates, web frames, doors and drawers (Note: The cabinet shall be free of defects and blemishes and conform to specified dimensions to a maximum tolerance of 2 mm).

★ indicates major element for assessment.

Specific Learner Expectations

Concept	Specific Learner Expectations
Materials	<i>The student will:</i> ● identify suitable materials, grades and features cabinet (i.e., cabinet hardware; e.g., door, drawer, shelf, specialty).
Tools, Equipment and Procedures	● demonstrate story pole used ● demonstrate proper drying and storage procedures ● build a face, plate and web frame ● describe methods of producing door treatments; e.g., raised panel door, flush, lip, overlap, etc. ● describe methods of cutting natural materials, laminates, synthetics and veneers.
Safety	● identify and conform to personal, shop and environmental safety procedures.
Design	● lay out materials aesthetically; e.g., book match panels ● sketch cabinet plans ● describe face frame construction ● describe panel construction.

MODULE MO301: ADVANCED CABINETRY (continued)

Concept	Specific Learner Expectations
Fastening Systems	<i>The student will:</i> ● identify and describe the current procedure for producing and securing joints ● describe industry procedures for using fasteners.
Finishing	● identify grades of cabinet finishes and their uses ● describe application procedures for plastic laminates ● apply laminates as required ● identify finishes, stains, fillers and sealers ● describe and demonstrate the procedures for preparing surfaces for finishing ● describe the procedures for applying finishes, stains, fillers and sealers ● finish a cabinet.
Careers	● identify and describe opportunities, occupations, trades and training related to cabinetry production.

MODULE MO302: FURNITURE BUILDING

Level: Advanced

Module Learner Expectations and Assessment Standards

Module Learner Expectations	Assessment Standards
<i>The student will:</i> ● demonstrate procedures related to the furniture-building process. Note: Furniture will be freestanding.	<i>The student will:</i> ● construct a furniture project reflecting a high quality of workmanship consistent with industry standards and the original plan ● lay out and use material in a manner that minimizes defects and waste while conforming to the original plan as closely as possible ● produce a finish consistent with industry standards for quality workmanship and aesthetics.

★ indicates major element for assessment.

Specific Learner Expectations

Concept	Specific Learner Expectations
Materials	<i>The student will:</i> ● select the appropriate materials that would enhance the aesthetic and functional attributes.
Tools, Equipment and Procedures	● lay out materials to minimize waste and defects ● produce a piece of furniture that has a high quality of workmanship and matches plan.
Safety	● demonstrate all relevant safety procedures.
Design	● identify how the fundamentals of good design (e.g., elements, principles) apply to the plans ● list steps in designing furniture ● complete a materials and cost estimate.
Fastening Systems	● demonstrate the industry procedures for use of required fastening systems.
Finishing	● demonstrate the industry procedures for use of required finishing procedures.
Careers	● identify and describe career opportunities.

MODULE MO303: ADVANCED MILLWORK PROJECT

Level: Advanced

Module Learner Expectations and Assessment Standards

Module Learner Expectations	Assessment Standards
<i>The student will:</i> ● demonstrate skills and techniques related to an advanced millwork project, incorporating multiple materials and joints.	<i>The student will:</i> ● construct and finish advanced millwork project that: – meets teacher approval for degree of challenge – includes two or more materials – includes two or more multiple part joints – conforms to the original/modified plan – meets industry standards for workmanship, fit, finish and relative strength ● identify and describe related careers.

★ indicates major element for assessment.

Specific Learner Expectations

Concept	Specific Learner Expectations
Materials	<i>The student will:</i> ● identify and select appropriate material.
Tools, Equipment and Procedures	● identify and safely demonstrate appropriate equipment tools and procedures.
Safety	● identify and demonstrate proper safety procedures.
Design	● draw and/or modify plans ● apply the fundamentals of good design.
Fastening Systems	● demonstrate appropriate selection and use of fastening systems.
Finishing	● demonstrate the appropriate selection and application of finishes.
Careers	● identify related careers.

MODULE MP301: PLANNING PRODUCTION

Level: Advanced

Module Learner Expectations and Assessment Standards

Module Learner Expectations	Assessment Standards
<i>The student will:</i> ● based on market investigation, select and design a product for manufacture ● identify resources and requirements available and required for the production of the product ● produce a prototype of the product.	<i>The student will:</i> ● define the term “marketing” and the five key elements of a marketing plan ● conduct a market survey using an appropriate number of contacts including: – who the customers are – where do they live/purchase products – what will they buy/look for in this type of item – how much will they spend on this type of item ● select and design a product that is appropriate to his or her skill level and resources based on the market research ● produce and refine a prototype of the selected product that conforms to the design specifications.

★ indicates major element for assessment.

Specific Learner Expectations

Concept	Specific Learner Expectations
Materials	<i>The student will:</i> ● identify a variety of materials for product ● select suitable materials for product (cost, durability, ease of production, availability)
Tools, Equipment and Procedures	● identify available resources on and off site ● produce a prototype of the product.
Safety	● identify personal, shop and environmental hazards ● evaluate the environmental impact of this product ● investigate and comply with legislation related to product safety.

MODULE MP301: PLANNING PRODUCTION (continued)

Concept	Specific Learner Expectations
Design	<i>The student will:</i> ● design product to minimize waste ● generate ideas for a project (problem identification) ● select parameters for market use, production ● select an appropriate product according to market investigation ● produce working drawings for product.
Fastening Systems	● demonstrate the use of required fasteners used in prototype ● select the appropriate fastening system dictated by product design.
Finishing	● select an appropriate finish ● apply required finish to prototype.
Careers	● identify career opportunities related to this process ● identify opportunities for further training related to process.

MODULE MP302: CREATING A PRODUCTION LINE

Level: Advanced

Module Learner Expectations and Assessment Standards

Module Learner Expectations	Assessment Standards
<i>The student will:</i> ● identify common fabrication methods and processes that can be used with available resources ● demonstrate tasks associated with assembly line setup ● test and refine production line with a pilot run.	<i>The student will:</i> ● suggest a variety of fabrication methods that may be used to maximize production line efficiency; e.g., prefabrication, templates use, jig set up ● draw a diagram of a proposed route that will maximize the efficiency of the proposed production activity. The diagram will include scheduling suggestions. The diagram will be neat, legible and drawn to scale using best available technology ● create a realistic worker and supply schedule to run the line in full production ● based on the success of a pilot run, suggest changes to: – product design – tooling – materials used – routing – scheduling.

★ indicates major element for assessment.

Specific Learner Expectations

Concept	Specific Learner Expectations
Materials	<i>The student will:</i> ● identify the type and quantity of materials required.
Tools, Equipment and Procedures	● identify available resources and select required units ● set up and use jigs for production work ● identify and define technical terms related to this process.
Safety	● evaluate the production line for personal and environmental safety ● monitor and redesign the production line for safety.

MODULE MP302: CREATING A PRODUCTION LINE (continued)

Concept	Specific Learner Expectations
Design	<i>The student will:</i> ● create a flow process chart and operation process chart ● draw process layout and position resources as required ● evaluate the production line design to minimize waste and inefficiencies ● refine production line (retool, reposition) units for maximum efficiency and effectiveness.
Fastening Systems	● maximize efficiency of fastening systems with available resources ● select and use suitable fasteners for assembly of the production line ● evaluate the fasteners for durability according to extent of production run.
Finishing	● maximize efficiency and safety of finishing application equipment.
Careers	● identify careers and further training in production line design.

MODULE MP303: PRODUCTION PROJECT

Level: Advanced

Module Learner Expectations and Assessment Standards

Module Learner Expectations	Assessment Standards
<i>The student will:</i> ● design, set up and participate in a manufacturing project that may incorporate other classes integrated into a production team.	<i>The student will:</i> ● prepare an organization plan for production and management personnel including job descriptions ● participate in a job rotation with a minimum of two of the following positions: production worker, quality control and line foreman ● work as a safe, cooperative and competent team member to produce a product to teacher-defined tolerances and original plan ● assist/instruct staff as required.

Specific Learner Expectations

Concept	Specific Learner Expectations
Materials	<i>The student will:</i> ● use materials as planned.
Tools, Equipment and Procedures	● demonstrate use of tool, equipment and procedures as planned.
Safety	● conform to all personal, shop and environmental safety standards ● conform to safety aspects of production plans.
Design	● reevaluate production plans during production.
Fastening Systems	● install fastening systems as planned.
Finishing	● finish product as planned.
Careers	● identify careers and further training related to this process.

MODULE MP304: PRODUCTION MANAGEMENT

Level: Advanced

Module Learner Expectations and Assessment Standards

Module Learner Expectations	Assessment Standards
<i>The student will:</i> ● provide the management required for an integrated production team.	<i>The student will:</i> ● monitor and manage the production, using available resources and technology including: – planning staff and material requirements and scheduling – safety plan monitoring – budgeting – plan modification/refinement ● produce a report summarizing the history, procedure, success of the project in addition to recommendations for future similar projects.

Specific Learner Expectations

Concept	Specific Learner Expectations
Materials	<i>The student will:</i> ● identify resources available for production management ● identify information resources (on or off campus) for management.
Tools, Equipment and Procedures	● manage the project according to available technology ● manage and monitor the process using appropriate techniques; e.g., critical path, bar charts.
Safety	● monitor and maintain a safe work environment through management techniques ● plan, implement and monitor a safety program.
Design	● identify the application of terms related to planning, scheduling, directing and quality control in production process ● demonstrate recruiting and managing staff, budgeting and scheduling ● identify possible planning, production, transportation and marketing department ● identify ways to modify the design to improve the product or marketability and/or change the purpose of the product.

MODULE MP304: PRODUCTION MANAGEMENT (continued)

Concept	Specific Learner Expectations
Fastening Systems	<i>The student will:</i> ● identify competencies related to fastening systems as required.
Finishing	● identify competencies related to finishing as required.
Careers	● identify current issues in production management ● identify career and further training opportunities related to production management.

MODULE AC301: CONSTRUCTION TECHNOLOGIES DESIGN**Level: Advanced****Module Learner Expectations and Assessment Standards**

Module Learner Expectations	Assessment Standards
<i>The student will:</i> ● investigate and describe the design of a structure or object and determine why the design follows the pattern it does.	<i>The student will:</i> ● produce an acceptable proposal that will contain a description of the design, sources of information to be used, rationale for the study, methodology, description of final report plus presentation and/or display (Note: The investigation shall include the aesthetic features, functional features, and structure of the object or structure) ● produce a report that conforms to format/style approved by teacher, adequately addresses all aspects of the proposal and identifies all major factors that affect the design ● produce a presentation and/or display of the design subject as described by the proposal.

Specific Learner Expectations

Concept	Specific Learner Expectations
Materials	<i>The student will:</i> ● identify materials used ● indicate how materials address aesthetics, function and structure.
Tools, Equipment and Procedures	● indicate instances where the equipment, tools and processes were dictated by design.
Safety	● conform to required safety procedures.
Design	● select an appropriate and realistic subject ● produce an acceptable report and presentation and/or display.
Fastening Systems	● identify critical fastening features.
Finishing	● identify critical finishing systems.
Careers	● identify careers associated with this type of task.

MODULE AC302: CONSTRUCTION TECHNOLOGIES PRODUCTION

Level: Advanced

Module Learner Expectations and Assessment Standards

Module Learner Expectations	Assessment Standards
<i>The student will:</i> ● investigate and describe the production process of an object or structure ● identify the factors that require this type of process.	<i>The student will:</i> ● produce an acceptable proposal that contains a description of the production process, sources of information to be used, rationale for the study, methodology, description of final report plus presentation and/or display (Note: The report shall identify all relevant production process features and attributes. The report shall include aesthetic (e.g., work environment) and functional (e.g., automated stations) features of the process. Research report shall conform to format/style approved by teacher and adequately address all aspects of proposal) ● produce a presentation and/or display of the innovation as described by the proposal.

Specific Learner Expectations

Concept	Specific Learner Expectations
Materials	<i>The student will:</i> ● identify how materials are handled to expedite production.
Tools, Equipment and Procedures	● identify and describe production and quality control, and scheduling.
Safety	● investigate how safety affects the production process ● conform to required safety procedures.
Design	● select an appropriate and realistic process to investigate ● identify type of production process design.
Fastening Systems	● identify how and why the required fastening systems were used.
Finishing	● identify how and why the required finishing was selected ● identify the importance and application of quality controls.
Careers	● identify related careers.

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